

2916

DRINKING WATER SURVEILLANCE PROGRAM

**CASSELMAN
WATER TREATMENT
PLANT**

REPORT FOR 1991 AND 1992

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REPORT FOR 1991 AND 1992**

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PIBS 2916

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

CASSELMAN WATER TREATMENT PLANT 1991 AND 1992 REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

The Casselman water treatment plant is a conventional treatment plant which treats water from the South Nation River. The process consists of coagulation, flocculation, clarification (upflow clarifier), filtration, pH adjustment, taste and odour control and disinfection. This plant has a rated capacity of $0.69 \times 1000 \text{ m}^3/\text{day}$. The Casselman water treatment plant serves a population of approximately 2,200.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

Table A is a summary of all results by group.

No known health related guidelines were exceeded.

The Casselman water treatment plant, for the sample years 1991 and 1992, produced acceptable quality water and this was maintained in the distribution system.

TABLE A
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	RAW		TREATED		LAVAL ST N		ST ANNE					
	TESTS	%POSITIVE	TESTS	%POSITIVE	TESTS	%POSITIVE	TESTS	%POSITIVE				
BACTERIOLOGICAL	48	36	75	16	6	37	12	1	8	12	9	75
CHEMISTRY (FIELD)	48	48	100	96	96	100	144	140	97	144	144	100
CHEMISTRY (LABORATORY)	372	360	96	375	300	80	488	452	92	498	463	92
METALS	384	181	47	384	156	40	552	265	48	552	262	47
CHLOROAROMATICS	168	0	0	168	0	0	126	0	0	140	0	0
CHLOROPHENOLS	24	0	0	24	0	0	.	.	.	.	.	.
PESTICIDES AND PCB	432	4	0	433	6	1	200	2	1	221	2	0
PHENOLICS	16	1	6	16	1	6	.	.	.	.	.	.
POLYAROMATIC HYDROCARBONS	116	0	0	116	0	0	99	0	0	116	0	0
SPECIFIC PESTICIDES	88	0	0	96	0	0	4	0	0	4	0	0
VOLATILES	474	0	0	443	54	12	352	41	11	354	39	11
RADIONUCLIDES	28	8	28	28	6	21	.	.	.	.	.	.
TOTAL	2,198	638		2,195	625		1,977	901		2,041	919	

DRINKING WATER SURVEILLANCE PROGRAM

CASSELMAN WATER TREATMENT PLANT 1991 AND 1992 REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Casselman water treatment plant in April of 1989. Previous annual reports were published for 1989 and 1990.

PLANT DESCRIPTION

The Casselman water treatment plant is a conventional treatment plant which treats water from the South Nation River. The process consists of coagulation, flocculation, clarification (upflow clarifier), filtration, pH adjustment, taste and odour control and disinfection. This plant has a rated capacity of $0.69 \times 1000 \text{ m}^3/\text{day}$. The Casselman water treatment plant serves a population of approximately 2,200.

The sample day flows ranged from $0.55 \times 1000 \text{ m}^3/\text{day}$ to $1.13 \times 1000 \text{ m}^3/\text{day}$.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Stringent DWSP sampling protocols were followed to ensure that all samples were collected in a uniform manner (see Appendix B).

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

To obtain a representative raw water sample, free from any added chemicals, at plants which used chlorine for zebra mussel control, the operator was required to turn off the chlorine feed to the mouth of the intake and allow enough time for the chlorinated water to clear from the intake works.

Plant operating personnel routinely analyzed parameters for process control (Table 2).

At all distribution system locations, two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples, therefore, were laboratory chemistry and metals. The free flow sample represented fresh water from the distribution system main, since the sample tap was flushed for five minutes prior to sampling.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between the raw and treated water sampling, flow rate, and treatment chemicals dosages.

Table 4 is a summary of all results by parameter and by water type. If a parameter was not detected, the total number of negative sample results is given. In contrast, if a parameter was detected at any location, the detailed results for all samples are provided.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment and Energy laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 4 and 5. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

The guidelines are evaluated on the results from the free flowing samples. Standing samples in the distribution system can show elevated concentrations in certain metals if the water is corrosive or if the standing time is excessive. Flushing the tap until the water achieves the coolest temperature will ensure that the water used for consumption will contain minimum concentrations of metals.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- THE TREATED AND DISTRIBUTED WATER;
- ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE
GUIDELINE VALUES; AND
- POSITIVE ORGANIC PARAMETERS DETECTED.

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Standard plate count was the only bacteriological analysis conducted on the treated and distributed water.

Standard plate count is a test used to supplement routine analysis for coliform bacteria. The limit for standard plate count (at 35°C after 48 hours) in the ODWOs is 500 counts/mL (based on a geometric mean of 5 or more samples). DWSP bacteriological analysis of treated and distributed water was limited to standard plate count.

Standard plate count (membrane filtration) exceeded the ODWO Aesthetic Objective of 500 counts/mL in 2 of 39 treated and distributed water samples with a maximum reported value of >2,400 counts/mL.

INORGANIC & PHYSICAL

CHEMISTRY (FIELD)

Field pH exceeded the ODWO Recommended Operational Guideline of 6.5-8.5 pH units in 2 of 39 treated and distributed water samples with a minimum reported value of 6.4 pH units and maximum reported value of 9.1 pH units.

It is desirable that the temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of delivered water may increase in the distribution system due to the warming effect of soil in late summer and fall and/or as a result of higher temperatures in the source water.

Field temperature exceeded the ODWO Aesthetic Objective of 15°C in 10 of 39 treated and distributed water samples with a maximum reported value of 22.0°C.

CHEMISTRY (LABORATORY)

Colour in drinking water may be due to the presence of natural or synthetic substances as well as certain metallic ions. Colour is measured in Hazen units (HZU).

Colour exceeded the ODWO Aesthetic Objective of 5 HZU in 28 of 39 treated and distributed water samples with a maximum reported value of 9.0 HZU.

Elevated conductivity is often associated with high hardness levels.

Conductivity exceeded the European Economic Community Aesthetic Guideline Level of 400 umho/cm in 32 of 39 treated and distributed water samples with a maximum reported value of 983 umho/cm.

Dissolved organic carbon exceeded the ODWO Aesthetic Objective of 5 mg/L in 21 of 39 treated and distributed water samples with a maximum reported value of 6.5 mg/L.

The ODWOs indicate that a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters provides an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and possess a tendency to form scale deposits and result in excessive soap consumption.

Hardness exceeded the ODWO Recommended Operational Guideline of 80-100 mg/L in all 37 treated and distributed water samples while 29 of these samples were above 200 mg/L with a maximum reported value of 367 mg/L.

Magnesium exceeded the European Economic Community Aesthetic Guideline Level of 30 mg/L in 3 of 37 treated and distributed water samples with a maximum reported value of 32.7 mg/L.

The European Economic Community has an Aesthetic Guideline Level of 0.05 mg/L for total ammonium.

Total ammonium exceeded the European Economic Community Aesthetic Guideline Level of 0.05 mg/L in 6 of 39 treated and distributed water samples.

The European Economic Community also has a Maximum Admissible Concentration of 0.50 mg/L for total ammonium set as a result of the concern for potential organic nitrogen contamination of the raw water.

Total ammonium exceeded the European Economic Community Maximum Admissible Concentration of 0.50 mg/L in 1 of 39 treated and distributed water samples with a maximum reported value of 0.502 mg/L.

Elevated ammonium levels, which occurred in the spring time during the snow melt and runoff period, may be attributed to agricultural activity.

pH exceeded the ODWO Recommended Operational Guideline of 6.5-8.5 pH units in 2 of 39 treated and distributed water samples with a maximum reported value of 8.51 pH units.

Dissolved solids exceeded the ODWO Aesthetic Objective of 500 mg/L in 5 of 39 treated and distributed water samples with a maximum reported value of 634 mg/L.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect

of turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO Maximum Acceptable Concentration for turbidity is 1.0 Formazin Turbidity Unit (FTU) and applies to the water leaving the treatment facility.

Turbidity exceeded the ODWO Maximum Acceptable Concentration of 1.0 FTU in 1 of 15 treated water samples with a maximum reported value of 1.26 FTU. This result was not confirmed by the corresponding and more reliable field turbidity result.

METALS

At present, there is no evidence that aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of aluminum in treated water is important to measure the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as aluminum in the water leaving the plant to avoid problems in the distribution system.

Aluminum exceeded the ODWO Recommended Operational Guideline of 100 ug/L in 4 of 39 treated and distributed water samples with a maximum reported value of 160 ug/L.

Manganese, in high concentrations, can contribute to laundry staining and undesirable tastes.

Manganese exceeded the ODWO Aesthetic Objective of 50 ug/L in 3 of 39 treated and distributed water samples with a maximum reported value of 72.0 ug/L.

ORGANIC

CHLOROAROMATICS

The results of the chloroaromatic scan showed that none were detected above trace levels.

CHLOROPHENOLS

The results of the chlorophenol scan showed that none were detected.

PESTICIDES AND PCB

Atrazine was found at positive levels in 3 of the 13 treated water samples analyzed. The maximum observed level was 1,350 ng/L. This was below the ODWO Interim Maximum Acceptable Concentration of 60,000 ng/L.

Cyanazine was found at a positive level in 1 of the 13 treated water samples analyzed. The maximum observed level was 1,840 ng/L. This was below the ODWO Interim Maximum Acceptable Concentration of 10,000 ng/L.

Other pesticides including desethyl atrazine, simazine, metolachlor and dicamba were also detected at trace levels.

Hexachlorocyclopentadiene was found at positive levels in 6 of the 18 treated and distributed water samples analyzed. The maximum observed level was 160 ng/L. This was below the United States Environmental Protection Agency Ambient Water Quality Criteria of 206,000 ng/L.

PHENOLICS

Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes. The ODWOs have been revised to replace the aesthetic phenolic objective with objectives for specific phenols.

Phenolics were found at a positive level in 1 of the 15 treated water samples analyzed. The maximum observed level was 1.4 ug/L.

POLYAROMATIC HYDROCARBONS

The results of the polyaromatic hydrocarbon scan showed that none were detected.

SPECIFIC PESTICIDES

The results of the specific pesticide scan showed that none were detected above trace levels.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology. Trace levels of styrene are considered to be laboratory artifacts resulting from the sample shipping containers.

Toluene was found at positive levels in 2 of the 38 treated and distributed water samples analyzed. The maximum observed level was 0.55 ug/L. This was below the ODWO Aesthetic Objective of 24 ug/L.

1,1,1-trichloroethane was found at a positive level in 1 of the 38 treated and distributed water samples analyzed. The maximum observed level was 0.24 ug/L. This was below the United States Environmental Protection Agency Maximum Contaminant Level of 200 ug/L.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THM results are discussed. Starting in 1991, samples from the distribution system were quenched with sodium thiosulphate to stop the further production of THMs in the sample bottle. This provided a more representative estimation of the THMs consumed in tap water.

Total trihalomethanes were found at positive levels in 35 of the 39 treated and distributed water samples analyzed. The maximum observed level was 192.2 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

It should be noted that levels of THMs in the treated water from February to April were lower than expected for this raw water source. Much of the chlorine, used as a disinfectant in the treatment process, was converted from a free chlorine residual to a combined residual by the high natural ammonia levels in the river. This, in turn, inhibited the formation of THMs because there was not enough free chlorine to react with the organic precursors. This phenomenon occurred in previous years.

RADIOLOGICAL

RADIONUCLIDES

There are more than 200 radionuclides, some of which occur naturally and others which originate from the activities of society. The radionuclides currently of greater interest from a health view-point are tritium, strontium-90, iodine-131, cesium-137 and radium-226. The gross beta and gross alpha determinations are suitable for preliminary screening except for tritium which must be measured separately. Radionuclides are measured in becquerels per litre (Bq/L). No results were above the available guidelines.

CONCLUSIONS

The presence of ammonia and the number of pesticides which were detected at the Casselman water treatment plant indicates that this raw water source is adversely affected by agricultural activity.

The results are similar to those found in previous years.

No known health related guidelines were exceeded.

The Casselman water treatment plant, for the sample years 1991 and 1992, produced acceptable quality water and this was maintained in the distribution system.

FIGURE 1

CASSELMAN WATER TREATMENT PLANT

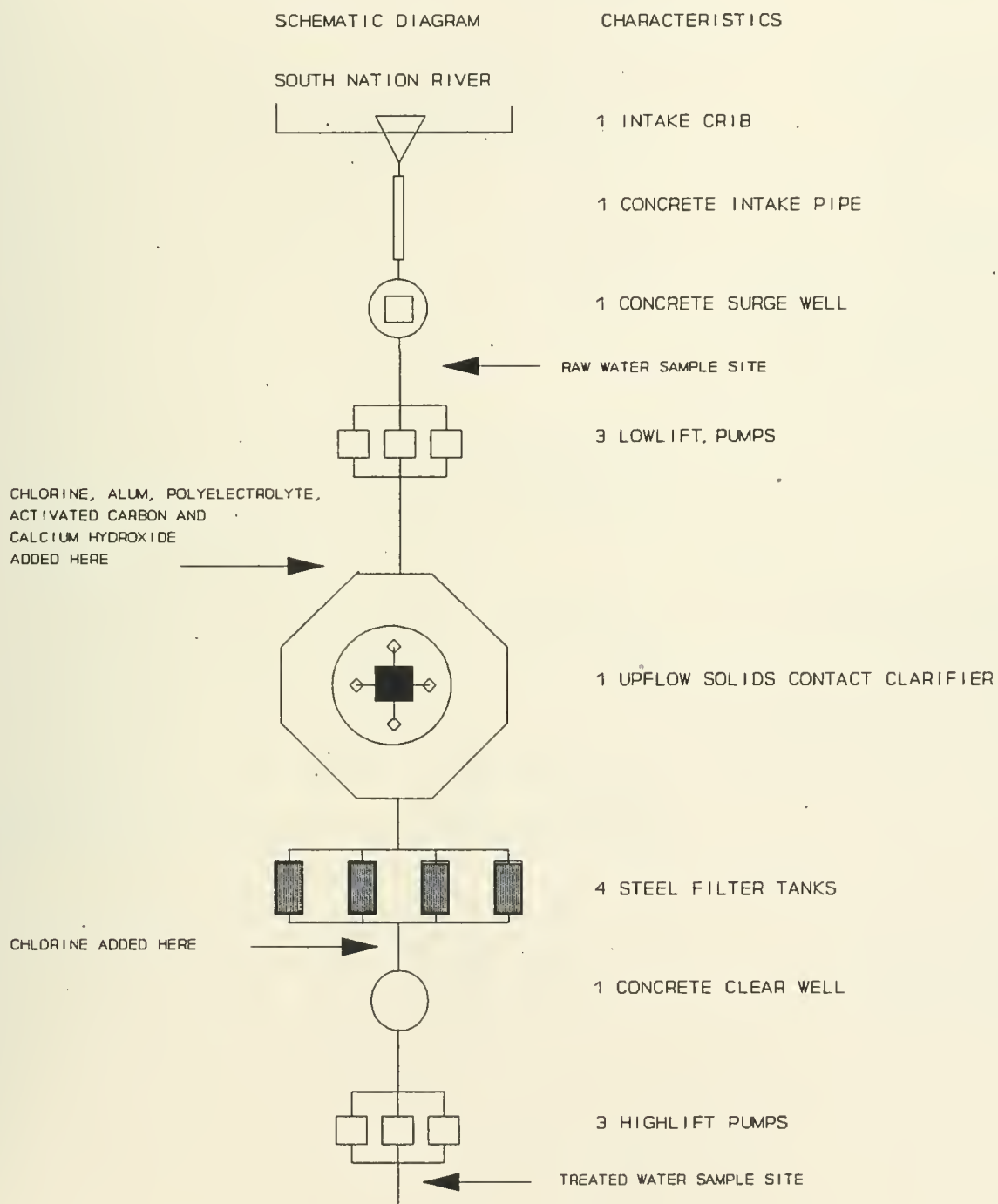


TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

PLANT GENERAL REPORT

PLANT NAME: CASSELMAN WTP
 WORKS #: 210001219
 UTM #: 184924005017500

DISTRICT: OTTAWA
 REGION: SOUTHEAST
 DISTRICT OFFICER: R. DUNN

SUPERINTENDENT: CLAUDE LEVESQUE

ADDRESS: 832 DROUIN ST.
 CASSELMAN, ONTARIO
 KOA 1M0
 613-764-5678

MUNICIPALITY: CASSELMAN
 AUTHORITY: PROVINCIAL

PLANT INFORMATION

PLANT VOLUME:	-	(X 1000 M3)
DESIGN CAPACITY:	3.180	(X 1000 M3/DAY)
RATED CAPACITY:	.690	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
-----	-----
CASSELMAN	3,500

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER -----	LOCATION -----	FREQUENCY -----
TOTAL CHLORINE RESIDUAL	TREATED	CONTINUOUS
PH	RAW TREATED	DAILY DAILY
TEMPERATURE	RAW TREATED	DAILY DAILY
TURBIDITY	FILTERED	CONTINUOUS
ALKALINITY	RAW TREATED	DAILY DAILY
COLOUR	RAW TREATED	DAILY DAILY

TABLE 3
DRINKING WATER SURVEILLANCE PROGRAM CASSELMAN WTP SAMPLE DAY CONDITIONS
AND TREATMENT CHEMICAL DOSAGES FOR 1991 AND 1992

DATE	DELAY * TIME(HRS)	FLOW (1000M3)	TASTE & ODOUR ACTIVATED CARBON POWDER	PRE CHLORINATION CHLORINE	COAGULATION ALUM LIQUID	INITIAL PH ADJUST CALCIUM HYDROXIDE	COAGULATION AID POLYELECTROLYTE	POST CHLORINATION CHLORINE
91 JAN 08	3.00	.802	2.50	2.59	150.90	1.00	1.76	2.59
91 FEB 05	3.00	.573	3.00	5.24	118.70	1.00	2.13	1.75
91 MAR 05	3.00	.551	4.00	1.80	117.60	1.00	1.60	.
91 APR 03	3.00	.659	4.00	3.00	108.20	1.00	1.40	.
91 MAY 07	3.00	.639	4.00	1.56	121.50	1.00	1.69	1.56
91 JUN 04	3.00	.791	3.00	7.59	106.50	1.00	1.47	3.79
91 JUL 03	3.00	1.090	2.00	8.25	107.00	1.00	1.49	1.83
91 SEP 04	3.00	.978	2.00	11.25	107.70	1.00	1.46	4.09
91 NOV 05	3.00	1.121	1.50	4.46	109.80	1.00	1.45	1.78
92 FEB 04	3.00	.720	1.00	.	108.00	1.00	1.14	1.52
92 APR 07	3.00	.760	3.00	2.63	102.30	2.00	.89	1.32
92 JUN 02	3.00	1.130	3.00	4.42	94.60	1.00	1.03	2.65
92 AUG 11	3.00	.782	3.00	3.84	91.15	1.00	1.30	3.84
92 OCT 06	3.00	.800	3.00	3.75	105.30	1.00	1.10	2.50
92 DEC 08	3.00	.860	3.00	1.16	97.90	1.00	1.08	2.33

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

KEY TO TABLE 4 and 5

- A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
 1. Maximum Acceptable Concentration (MAC)
 1+. MAC for Total Trihalomethanes
 2. Interim Maximum Acceptable Concentration (IMAC)
 3. Aesthetic Objective (AO)
 3*. AO for Total Xylenes
 4. Recommended Operational Guideline
 5. Health Related Guidance Value
- B HEALTH & WELFARE CANADA (H&W)
 1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
 4. Aesthetic Objective (AO)
- C WORLD HEALTH ORGANIZATION (WHO)
 1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
 1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Quality Criteria
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
 1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissable Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- I NEW YORK STATE AMBIENT WATER GUIDELINE
- N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

. No Sample Taken

BDL Below Minimum Measurement Amount

<T Greater Than Detection Limit But Not Confident
(SEE INTERPRETATION OF RESULTS ABOVE)

> Results Are Greater Than The Upper Limit

<=> Approximate Result

!48 No Data: Sample Age Exceeded 48 Hours

!AR No Data: No Numeric Results

!AW No Data: Analysis Withdrawn

!BT No Data: Sample Broken In Transit

!CS No Data: Contamination Suspected

!EF No Data: Laboratory Equipment Failure

!IR No Data: Insufficient Sample

!IS No Data: Insufficient Sample

!LA No Data: Laboratory Accident

!NP No Data: No Procedure

!NR No Data: Sample Not Received

!OP No Data: Obscured Plate

!PE No Data: Procedure Error: Sample Discarded

!PR No Data: Preservative Required

!QU No Data: Quality Control Unacceptable

!RE No Data: Received Empty

!RO No Data: No Numeric Results

!SM No Data: Sample Missing

!SS No Data: Sample Improperly Preserved

!U No Data: Sample Unsuitable For Analysis

!UB No Data: Bottle Broken

!UN No Data: Result Unreliable

!UR	No Data: Unpreserved Sample Required
A	Approximate Value
A3C	Approximate, Total Count Exceeded 300 Colonies
A>	Approximate Value, Exceeded Normal Range
APS	Additional Peak, Less Than, Not Priority Pollutant
ARO	Additional Information In Laboratory Report
CRO	Calculated Result Only
NAF	Not All Required Tests Found
RID	Ioncal Calculated on Incomplete Data Set
RMP	P and M-Xylene Not Separated
RRR	Result Obtained by Repeat Analysis
RRV	Rerun Verification
SFA	Sample Filtered: Filtrate Analyzed
SIL	Sample Incorrectly Labelled
SPS	Several Peaks, Small, Not Priority Pollutant
U48	Unreliable: Sample Age Exceeded 48 Hours
UAL	Unreliable: Sample Age Exceeded Limit
UAU	Unreliable: Sample Age Unknown
UCS	Unreliable: Contamination Suspected
WSD	Wrong Sample Description On Bottle

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
BACTERIOLOGICAL					
FECAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 0 (A1)	
1991 JAN	56	.	.	.	.
1991 FEB	108	.	.	.	.
1991 MAR	940	.	.	.	.
1991 APR	50 <=>	.	.	.	.
1991 MAY	90 <=>	.	.	.	.
1991 JUN	140	.	.	.	.
1991 JUL	20 <=>	.	.	.	.
1991 SEP	10 <=>	.	.	.	.
1991 NOV	2	.	.	.	.
1992 FEB	18	.	.	.	.
1992 APR	54	.	.	.	.
1992 JUN	600 >	.	.	.	.
1992 AUG	80 <=>	.	.	.	.
1992 OCT	10 <=>	.	.	.	.
1992 DEC	68	.	.	.	.
STANDRD PLATE CNT MF (CT/ML)					
		DET'N LIMIT = 0		GUIDELINE = 500 (A3)	
1991 JAN	.	2 <=>	2 <=>	5 <=>	.
1991 FEB	.	5 <=>	3 <=>	5 <=>	.
1991 MAR	.	15	10	14	.
1991 APR	.	3 <=>	4 <=>	2 <=>	.
1991 MAY	.	6 <=>	6 <=>	34	.
1991 JUN	.	25	9 <=>	12	.
1991 JUL	.	4 <=>	4 <=>	1800	.
1991 SEP	.	480	0 <=>	2400 >	.
1991 NOV	.	0 <=>	1 <=>	32	.
1992 FEB	.	4 <=>	3 <=>	.	.
1992 APR	.	10	.	26	.
1992 JUN	.	21	3 <=>	.	.
1992 AUG	.	140	.	48	.
1992 OCT	.	6 <=>	4 <=>	.	.
1992 DEC	.	3 <=>	.	18	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
BACTERIOLOGICAL					
TOTAL COLIFORM MF (CT/100ML)		DET/N LIMIT = 0		GUIDELINE = 5/100ML (A1)	
1991 JAN	13100 A3C	.	.	.	.
1991 FEB	1900	.	.	.	.
1991 MAR	22000	.	.	.	.
1991 APR	2400	.	.	.	.
1991 MAY	400 A3C	.	.	.	.
1991 JUN	200 <=>	.	.	.	.
1991 JUL	B0L	.	.	.	.
1991 SEP	300 <=>	.	.	.	.
1991 NOV	500 <=>	.	.	.	.
1992 FEB	800 <=>	.	.	.	.
1992 APR	10300 A3C	.	.	.	.
1992 JUN	1100 A3C	.	.	.	.
1992 AUG	200 <=>	.	.	.	.
1992 OCT	200 A3C	.	.	.	.
1992 DEC	1420 A3C	.	.	.	.
T COLIFORM BCKGRD MF (CT/100ML)					
DET/N LIMIT = 0		GUIDELINE = N/A			
1991 JAN	38000 A3C	.	.	.	.
1991 FEB	5000	.	.	.	.
1991 MAR	80000	.	.	.	.
1991 APR	13000	.	.	.	.
1991 MAY	20800 A3C	.	.	.	.
1991 JUN	70000 A3C	.	.	.	.
1991 JUL	80000 A3C	.	.	.	.
1991 SEP	10000 A3C	.	.	.	.
1991 NOV	40000 >	.	.	.	.
1992 FEB	68000 A3C	.	.	.	.
1992 APR	40000 A3C	.	.	.	.
1992 JUN	20000 A3C	.	.	.	.
1992 AUG	30000 A3C	.	.	.	.
1992 OCT	18400 A3C	.	.	.	.
1992 DEC	6600 A3C	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (FIELD)						
FLO CHLORINE (COMB) (MG/L)			OET/N LIMIT = 0			
			GUIDELINE = N/A			
1991 JAN	.	.300	.450	.400	.300	.200
1991 FEB	.	.300	.500	.600	.200	.300
1991 MAR	.	.400	.200	.300	.200	.200
1991 APR	.	.200	.400	.300	.300	.200
1991 MAY	.	.200	.300	.200	.220	.180
1991 JUN	.	.300	.400	.200	.300	.200
1991 JUL	.	.300	.200	.300	.200	.200
1991 SEP	.	.400	.400	.200	.300	.200
1991 NOV	.	.240	.400	.200	.200	.200
1992 FEB	.	.500	.500	.400	.200	.200
1992 APR	.	.800	.	.	.200	.130
1992 JUN	.	.420	.400	.300	.	.
1992 AUG	.	.600	.	.	.300	.300
1992 OCT	.	.400	.500	.400	.	.
1992 DEC	.	.220	.	.	.200	.200
FLO CHLORINE FREE (MG/L)			DET/N LIMIT = 0			
			GUIDELINE = N/A			
1991 JAN	.	.300	.000	.000	.100	.100
1991 FEB	.	.500	.100	.000	.300	.100
1991 MAR	.	.400	.200	.000	.200	.100
1991 APR	.	.300	.100	.100	.200	.200
1991 MAY	.	.420	.200	.150	.120	.060
1991 JUN	.	.400	.100	.200	.200	.100
1991 JUL	.	.200	.200	.100	.100	.100
1991 SEP	.	.300	.200	.100	.100	.100
1991 NOV	.	.360	.100	.200	.300	.200
1992 FEB	.	.300	.200	.100	.	.
1992 APR	.	.500	.200	.100	.150	.070
1992 JUN	.	.400	.200	.100	.	.
1992 AUG	.	.100	.200	.200	.200	.100
1992 OCT	.	.300	.200	.200	.	.
1992 DEC	.	.580	.	.	.200	.100

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (FIELD)					
FLD CHLORINE (TOTAL) (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A	
1991 JAN	.600	.450	.400	.400	.300
1991 FEB	.800	.600	.600	.500	.400
1991 MAR	.800	.400	.300	.400	.300
1991 APR	.500	.500	.400	.500	.400
1991 MAY	.620	.500	.350	.340	.240
1991 JUN	.700	.500	.400	.500	.300
1991 JUL	.500	.400	.400	.300	.300
1991 SEP	.700	.600	.300	.400	.300
1991 NOV	.600	.500	.400	.500	.400
1992 FEB	.800	.700	.500	.	.
1992 APR	1.300	.	.	.350	.200
1992 JUN	.820	.600	.400	.	.
1992 AUG	.700	.	.	.500	.400
1992 OCT	.700	.700	.600	.	.
1992 DEC	.800	.	.	.400	.300
FLD PH (OMNSLESS)					
		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
1991 JAN	7.500	6.900	7.200	7.000	6.900
1991 FEB	7.500	7.000	7.300	7.100	7.100
1991 MAR	7.500	6.800	7.300	6.800	6.900
1991 APR	7.800	6.900	7.200	7.000	7.100
1991 MAY	7.600	7.000	7.600	7.600	7.800
1991 JUN	7.600	7.200	7.600	7.300	7.400
1991 JUL	8.000	7.300	7.800	7.000	7.100
1991 SEP	7.400	7.200	7.400	7.100	7.100
1991 NOV	6.500	7.200	7.500	7.100	7.000
1992 FEB	7.100	7.000	7.300	.	.
1992 APR	6.800	.	.	6.700	6.600
1992 JUN	7.500	6.800	7.300	.	.
1992 AUG	7.800	.	.	9.100	7.200
1992 OCT	7.600	7.100	7.400	.	.
1992 DEC	7.900	.	.	7.200	7.300

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHEMISTRY (FIELD)				GUIDELINE = 15 (A3)			
		FLD TEMPERATURE (DEG.C)	DET/N LIMIT = N/A	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING		
1991 JAN	1.000	1.000	6.000	15.000	6.000	17.000			
1991 FEB	1.000	1.000	5.000	17.000	6.000	16.000			
1991 MAR	1.000	1.000	4.000	14.000	5.000	11.000			
1991 APR	4.000	4.000	6.000	9.000	6.000	13.000			
1991 MAY	16.000	13.000	12.000	19.000	11.000	18.000			
1991 JUN	18.000	18.000	20.000	17.000	14.000	20.000			
1991 JUL	23.000	22.000	15.000	17.000	17.000	19.000			
1991 SEP	23.000	22.000	20.000	19.000	18.000	19.000			
1991 NOV	8.000	8.000	10.000	16.000	14.000	17.000			
1992 FEB	2.000	2.000	3.000	12.000	9.000	11.000			
1992 APR	2.000	2.000	13.000	18.000	12.000	18.000			
1992 JUN	19.000	22.000	16.000	20.000	9.000	19.000			
1992 AUG	22.000	14.000	3.000						
1992 OCT	14.000								
1992 DEC	3.000								
FLO TURBIDITY (FTU)		CHEMISTRY (FIELD)				GUIDELINE = 1.0 (A1)			
		FLD TEMPERATURE (DEG.C)	DET/N LIMIT = N/A	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING		
1991 JAN	5.200	.300	.200	.350	.400	.420			
1991 FEB	5.300	.310	.600	.400	.270	.320			
1991 MAR	24.000	.380	.400	.320	.420	.450			
1991 APR	20.000	.380	.400	.200	.400	.420			
1991 MAY	32.000	.200	.300	.340	.360	.380			
1991 JUN	8.600	.240	.300	.100	.260	.340			
1991 JUL	7.100	.250	.400	.300	.480	.420			
1991 SEP	6.500	.280	.500	.400	.360	.340			
1991 NOV	16.000	.200	.400	.300	.300	.320			
1992 FEB	5.000	.400		.300	.260	.300			
1992 APR	26.000	.340	.200	.300	.300	.280			
1992 JUN	12.000	.460	.500	.200	.300	.320			
1992 AUG	6.000	.220	.500	.200	.400	.320			
1992 OCT	8.300	.250							
1992 DEC	8.400	.670							

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (LABORATORY)						
ALKALINITY (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 30-500 (A4)	
1991 JAN	228.100	160.500	160.400	163.100	156.200	151.300
1991 FEB	282.000	232.000	231.000	229.800	229.100	232.700
1991 MAR	91.700	44.900	45.100	45.000	49.300	65.200
1991 APR	158.000	104.100	102.800	101.700	101.000	99.400
1991 MAY	214.800	159.100	160.100	160.100	160.000	159.200
1991 JUN	216.300	160.000	159.600	158.400	159.100	158.600
1991 JUL	231.500	174.900	175.700	175.200	175.000	175.300
1991 SEP	205.000	145.700	145.600	145.800	146.400	147.500
1991 NOV	192.000	139.300	139.400	139.300	138.800	139.700
1992 FEB	222.500	176.800	178.600	177.300		
1992 APR	74.200	39.600			39.600	38.900
1992 JUN	209.500	163.200	159.800	158.400		
1992 AUG	187.100	178.800			181.000	181.900
1992 OCT	231.100	171.200	171.100	171.000		
1992 DEC	252.600	181.200			182.600	184.800
CALCIUM (MG/L)			DET'N LIMIT = 0.20		GUIDELINE = 100 (F2)	
1991 JAN	82.100	74.200	75.900	74.300	73.100	72.200
1991 FEB	94.800	92.600	93.200	90.000	91.800	92.400
1991 MAR	32.400	31.400	31.600	31.200	32.800	39.000
1991 APR	52.000	50.200	50.200	49.800	49.600	48.800
1991 MAY	73.000	72.400	74.200	71.600	71.600	72.000
1991 JUN	74.600	76.600	75.400	75.400	74.800	74.200
1991 JUL	69.800	71.000	71.400	72.000	72.200	71.400
1991 SEP	57.400	58.100	58.300	57.600	58.800	59.100
1991 NOV	56.800	57.000	57.700	58.500	58.700	57.800
1992 FEB	IDI	IDI	IDI			
1992 APR	29.700	32.500			32.500	32.400
1992 JUN	76.400	77.400	78.000	77.600		
1992 AUG	76.550	80.700			82.450	82.250
1992 OCT	77.500	75.250	76.500	76.500		
1992 DEC	87.550	82.100			81.650	82.450
CYANIDE (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 0.2 (A1)	
26 SAMPLES		BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM		DIST. SYSTEM		DIST. SYSTEM	
		LAVAL ST N FREE FLOW	LAVAL ST N STANDING	ST ANNE FREE FLOW	ST ANNE STANDING	ST ANNE FREE FLOW	ST ANNE STANDING
CHEMISTRY (LABORATORY)							
CHLORIDE (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 250 (A3)			
1991 JAN	25.400	26.300	26.500	26.300	25.400	25.400	25.400
1991 FEB	51.300	55.700	56.200	55.500	55.800	56.700	56.700
1991 MAR	10.500	10.900	11.000	11.200	11.900	15.500	15.500
1991 APR	16.100	16.700	16.600	16.400	16.300	15.900	15.900
1991 MAY	23.500	26.400	26.300	26.400	26.000	26.200	26.200
1991 JUN	21.600	30.000	30.000	30.000	30.300	30.900	30.900
1991 JUL	28.300	36.300	37.100	36.900	38.400	38.100	38.100
1991 SEP	37.800	47.800	48.000	47.700	47.700	47.700	47.700
1991 NOV	52.100	55.900	56.000	55.800	56.100	56.200	56.200
1992 FEB	91.900	92.800	92.800	93.700			
1992 APR	10.100	12.700			12.800	13.100	13.100
1992 JUN	36.800	42.800	42.700	43.000			
1992 AUG	49.600	59.400			60.800	61.300	61.300
1992 OCT	45.800	47.500	48.000	47.600			
1992 DEC	41.900	37.800			38.100	38.800	38.800
COLOUR (HZU)							
		DET'N LIMIT = 0.50		GUIDELINE = 5 (A3)			
1991 JAN	43.000	8.000	8.000	8.000	8.500	8.500	8.500
1991 FEB	32.000	8.500	9.000	9.500	9.000	9.500	9.500
1991 MAR	36.000	3.000	3.000	3.000	3.500	3.500	3.500
1991 APR	34.000	4.500	4.500	4.500	4.500	1.000 <T	1.000 <T
1991 MAY	53.500	7.000	6.500	7.500	7.000	7.500	7.500
1991 JUN	44.500	7.500	8.000	8.500	8.000	8.500	8.500
1991 JUL	40.000	9.000	8.500	9.000	9.000	9.000	9.000
1991 SEP	27.000	5.500	6.000	6.000	6.000	6.000	6.000
1991 NOV	18.000	4.000	3.000	4.000	3.500	3.500	3.500
1992 FEB	23.000	6.000	6.500	6.500			
1992 APR	39.500	3.000			3.000	3.000	3.000
1992 JUN	49.500	7.000	8.000	7.500	7.000	7.000	7.000
1992 AUG	40.500	6.000					
1992 OCT	27.500	5.500	6.000	6.000			
1992 DEC	33.000	8.000			8.500	9.000	9.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT -RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (LABORATORY)					
CONDUCTIVITY (UMHO/CM)	DET/N LIMIT = 1.0		GUIDELINE = 400 (F2)		
1991 JAN	602	591	591	577	569
1991 FEB	766	779	780	778	787
1991 MAR	240	250	257	271	322
1991 APR	393	392	389	387	382
1991 MAY	500	527	528	527	526
1991 JUN	498	526	523	523	523
1991 JUL	569	599	595	594	596
1991 SEP	537	567	567	567	568
1991 NOV	620	645	643	645	647
1992 FEB	957	983	971		
1992 APR	234	261	261	261	260
1992 JUN	586	623	620		
1992 AUG	675	675	638	754	758
1992 OCT	639	638	638		
1992 DEC	726			675	677
DISS ORG CARBON (MG/L)					
		DET/N LIMIT = 0.10		GUIDELINE = 5.0 (A3)	
1991 JAN	8.700	4.900	4.500	5.100	4.800
1991 FEB	8.100	5.300	5.100	5.200	5.200
1991 MAR	7.500	3.300	3.300	3.300	3.400
1991 APR	7.500	3.200	3.400	3.100	3.200
1991 MAY	9.900	4.700	4.500	4.800	4.600
1991 JUN	9.800	5.400	5.300	5.400	5.500
1991 JUL	11.200	6.500	6.200	6.300	6.400
1991 SEP	10.000	5.900	6.100	5.700	5.800
1991 NOV	6.900	3.900	3.900	3.800	4.200
1992 FEB	6.000	3.900	3.900		
1992 APR	7.500			3.100	3.300
1992 JUN	12.000	6.200	6.400		
1992 AUG	9.800			5.400	5.300
1992 OCT	8.600	5.300	5.300		
1992 DEC	8.500			5.500	5.500

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (LABORATORY)					
FLUORIDE (MG/L)		DET'N LIMIT = 0.01			
		GUIDELINE = 1.5 (A1)			
1991 JAN	.140	.060	.060	.060	.060
1991 FEB	.140	.060	.060	.060	.060
1991 MAR	.060	.020 <T	.020 <T	.020 <T	.020 <T
1991 APR	.100	.040 <T	.040 <T	.040 <T	.040 <T
1991 MAY	.120	.060	.060	.060	.060
1991 JUN	.140	.060	.060	.080	.080
1991 JUL	.160	.060	.060	.080	.080
1991 SEP	.160	.080	.080	.080	.080
1991 NOV	.160	.060	.060	.060	.060
1992 FEB	.160	.080	.080	.	.
1992 APR	.100	.040 <T	.040 <T	.020 <T	BdL
1992 JUN	.120	.060	.	.	.
1992 AUG	.140	.080	.060	.080	.080
1992 OCT	.140	.060	.	.	.
1992 DEC	.160	.100	.	.080	.100
HARDNESS (MG/L)		DET'N LIMIT = 0.5			
		GUIDELINE = 80-100 (A4)			
1991 JAN	314.100	284.700	286.600	276.900	273.400
1991 FEB	372.000	366.000	358.000	363.000	364.000
1991 MAR	111.000	106.000	106.000	112.000	136.000
1991 APR	187.000	178.000	175.000	175.000	172.000
1991 MAY	263.000	261.000	259.000	260.000	261.000
1991 JUN	254.000	259.000	257.000	254.000	253.000
1991 JUL	269.000	268.000	272.000	271.000	269.000
1991 SEP	238.000	237.600	237.300	240.300	241.000
1991 NOV	240.500	240.500	246.200	246.900	241.800
1992 FEB	Idl	Idl	Idl	.	.
1992 APR	103.000	107.000	287.000	107.000	106.000
1992 JUN	282.000	286.000	.	.	.
1992 AUG	293.400	310.660	.	317.730	319.000
1992 OCT	291.120	280.480	283.630	.	.
1992 DEC	342.070	308.920	283.630	309.110	310.320

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
CHEMISTRY (LABORATORY)								
IONCAL (DMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = N/A			
1991 JAN	4.352	1.769	2.571	2.666	1.322	3.430		
1991 FEB	.047	1.184 NAF	2.785 NAF	1.955 NAF	2.491 NAF	1.487 NAF		
1991 MAR	5.515 RID	4.271 RID	5.118 RID	3.952 RID	2.995 RID	3.422 RID		
1991 APR	.081	1.237	.932	.936	.752	.857		
1991 MAY	4.315	3.324	4.521	2.626	3.287	3.723		
1991 JUN	1.351 NAF	1.547 NAF	.889 NAF	.109 NAF	.929 NAF	1.104 NAF		
1991 JUL	.694	.161	.200	1.180	.278	.475		
1991 SEP	1.191 NAF	3.029 NAF	3.152 NAF	3.526 NAF	2.494 NAF	2.831 NAF		
1991 NOV	1.921 NAF	.318 NAF	.348 NAF	2.464 NAF	2.108 NAF	.326 NAF		
1992 FEB	.000 NAF	.000 NAF	.000 NAF	.000 NAF	.	.		
1992 APR	4.665	16.440	.	.	1.700	2.470		
1992 JUN	4.409	4.885	4.483	4.158	.	.		
1992 AUG	4.796	2.286 NAF	.	.	4.575 NAF	4.681 NAF		
1992 OCT	.145	.288	1.033	1.255	.	.		
1992 DEC	2.795	1.351	.	.	1.955	1.259		
POTASSIUM (MG/L)								
			DET'N LIMIT = 0.01		GUIDELINE = 10 (F2)			
1991 JAN	2.860	2.650	2.720	2.680	2.650	2.730		
1991 FEB	3.300	3.350	3.200	3.400	3.250	3.300		
1991 MAR	3.300	3.600	3.700	3.550	3.550	3.550		
1991 APR	2.550	2.250	2.200	2.250	2.300	2.650		
1991 MAY	2.650	2.700	2.580	2.660	2.640	2.710		
1991 JUN	3.300	3.300	3.300	3.200	3.400	3.350		
1991 JUL	2.450	2.500	2.550	2.550	2.550	2.650		
1991 SEP	2.970	2.980	2.990	3.010	3.000	2.980		
1991 NOV	4.250	4.130	4.240	4.290	4.350	4.330		
1992 FEB	101	101	101	101	.	.		
1992 APR	3.510	3.140	.	.	3.200	3.350		
1992 JUN	3.080	2.990	2.970	2.940	.	.		
1992 AUG	3.928	3.934	.	.	3.966	3.982		
1992 OCT	5.107	5.157	5.174	5.167	.	.		
1992 DEC	3.200	2.924	.	.	2.954	2.987		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
		FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
CHEMISTRY (LABORATORY)									
LANGELLIERS INDEX (OMNSLESS)									
DET'N LIMIT = N/A									
GUIDELINE = N/A									
1991 JAN	1.202	.576	.636	.664	.659	.611			
1991 FEB	1.018	.602 NAF	.693 NAF	.595 NAF	.703 NAF	.852 NAF			
1991 MAR	.137 RID	-.503 RID	-.446 RID	-.605 RID	-.389 RID	-.098 RID			
1991 APR	.614	-.042	-.138	-.165	-.080	-.033			
1991 MAY	1.165	.558	.641	.576	.726	.726			
1991 JUN	.907	.275	.457	.394	.572	.608			
1991 JUL	1.201	.494	.588	.521	.802	.897			
1991 SEP	.946	.740	.611	.597	.718	.593			
1991 NOV	.925	.296	.352	.348	.347	.403			
1992 APR	.010	-.624	-	-	-.484	-.653			
1992 JUN	1.165	.759	.833	.787	.785 NAF	.786 NAF			
1992 AUG	1.091	.661 NAF	-	.513	-	-			
1992 OCT	1.130	.497	.524	-	.448	.468			
1992 DEC	1.127	.358	-	-	-	-			
MAGNESIUM (MG/L)									
DET'N LIMIT = 0.1									
GUIDELINE = 30.0 (F2)									
1991 JAN	26.500	24.150	24.100	24.550	22.900	22.600			
1991 FEB	32.900	32.700	32.600	32.400	32.400	32.300			
1991 MAR	7.200	6.700	6.900	6.900	7.300	9.500			
1991 APR	14.000	12.700	12.700	12.400	12.400	12.300			
1991 MAY	19.500	19.300	19.200	19.500	19.800	19.700			
1991 JUN	16.400	16.600	15.900	16.600	16.400	16.500			
1991 JUL	23.100	21.900	21.800	22.300	21.900	22.100			
1991 SEP	23.000	22.500	22.950	22.700	22.700	22.700			
1991 NOV	24.000	23.850	23.900	24.350	24.400	23.700			
1992 FEB	101	101	101	101	-	-			
1992 APR	6.920	6.330	-	-	6.190	6.070			
1992 JUN	22.000	22.600	22.400	22.500	-	-			
1992 AUG	24.840	26.520	-	-	27.180	27.600			
1992 OCT	23.700	22.500	22.500	22.500	-	-			
1992 DEC	30.000	25.260	-	-	25.560	25.380			

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHEMISTRY (LABORATORY)				DIST. SYSTEM				DIST. SYSTEM	
		SODIUM (MG/L)	DET'N LIMIT = 0.20	LAVAL ST N FREE FLOW	LAVAL ST N STANDING	DET'N LIMIT = 200 (A4)	LAVAL ST N FREE FLOW	LAVAL ST N STANDING	ST ANNE FREE FLOW	ST ANNE STANDING	
1991 JAN	18.200	16.800	16.500	16.800	16.800	15.900	15.900	15.700	15.900	15.700	
1991 FEB	28.200	29.000	30.800	30.800	30.800	32.000	32.000	32.000	32.000	32.000	
1991 MAR	5.800	5.800	5.800	5.800	5.800	6.400	6.400	8.800	6.400	8.800	
1991 APR	9.800	8.600	8.600	8.600	8.400	8.200	8.200	8.200	8.200	8.200	
1991 MAY	16.000	15.600	15.800	15.800	15.800	15.800	15.800	16.000	15.800	16.000	
1991 JUN	15.400	15.000	14.800	14.800	14.600	14.400	14.400	14.800	14.400	14.800	
1991 JUL	19.600	18.400	18.600	18.600	18.800	19.000	19.000	19.800	19.000	19.800	
1991 SEP	26.200	26.400	26.300	26.300	26.300	26.600	26.600	26.500	26.600	26.500	
1991 NOV	36.900	36.900	37.100	37.100	37.400	37.600	37.600	38.500	37.600	38.500	
1992 FEB	101	101	101	101	101						
1992 APR	5.330	4.850				4.800	4.800	4.980	4.800	4.980	
1992 JUN	24.400	23.200	23.200	23.200	23.000						
1992 AUG	5.180	5.500				5.580	5.580	5.660	5.580	5.660	
1992 OCT	27.360	25.980	25.800	25.800	26.220						
1992 DEC	23.100	18.890				19.240	19.240	19.340	19.240	19.340	
AMMONIUM TOTAL (MG/L)											
DET'N LIMIT = 0.002						GUIDELINE = 0.05 (F2)					
1991 JAN	.036	.012	.014	.012	.012	.010	.010	.032	.010	.032	
1991 FEB	.152	.002 <T	.002 <T	.008 <T	.008 <T	.002 <T	.002 <T	.010	.002 <T	.010	
1991 MAR	.432	.498	.502	.502	.502	.500	.500	.466	.500	.466	
1991 APR	.088	.008 <T	.010	.014	.014	.006 <T	.006 <T	.018	.006 <T	.018	
1991 MAY	.022	.006 <T	.006 <T	.014	.014	.008 <T	.008 <T	.016	.008 <T	.016	
1991 JUN	.322	.008 <T	.010	.014	.014	.012	.012	.026	.012	.026	
1991 JUL	.088	.018	.012	.022	.022	.018	.018	.030	.012	.030	
1991 SEP	.018	.014	.014	.018	.018	.012	.012	.016	.012	.016	
1991 NOV	.060	.006 <T	.006 <T	.010	.010	.006 <T	.006 <T	.020	.006 <T	.020	
1992 FEB	.210	.190	.188	.200	.200	.122	.122	.154	.122	.154	
1992 APR	.292	.116									
1992 JUN	.140	.004 <T	.008 <T	.006 <T	.006 <T	.006 <T	.006 <T	.006 <T	.006 <T	.006 <T	
1992 AUG	.054	.006 <T									
1992 OCT	.020	.010	.014	.010	.010						
1992 DEC	.008 <T	.004 <T				.004 <T	.004 <T	.012	.004 <T	.012	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW		DIST. SYSTEM LAVAL ST N STANDING		DIST. SYSTEM ST ANNE FREE FLOW		DIST. SYSTEM ST ANNE STANDING	
CHEMISTRY (LABORATORY)										
NITRITE (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 1.0 (A1)		DET'N LIMIT = 0.005		GUIDELINE = 10.0 (A1)	
1991 JAN	.031	.002 <T	.002 <T	.001 <T	.002 <T	.002 <T	.002 <T	.002 <T	.002 <T	.002 <T
1991 FEB	.019	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	.001 <T
1991 MAR	.024	.006	.003 <T	.003 <T	.003 <T	.003 <T	.005	.005	.006	.006
1991 APR	.022	.002 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T
1991 MAY	.027	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T
1991 JUN	.092	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.002 <T	.002 <T	.002 <T	.001 <T
1991 JUL	.020	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T
1991 SEP	.062	BDL	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.002 <T
1991 NOV	.014	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.002 <T
1992 FEB	.022	.005	.007	.006	.006	.006	.	.004 <T	.	.008
1992 APR	.036	.003 <T	.003 <T	.003 <T	.003 <T	.003 <T	.	.001 <T	.	.002 <T
1992 JUN	.018	.002 <T	.002 <T	.002 <T	.002 <T	.002 <T	.	.002 <T	.	.002 <T
1992 AUG	.036	.001 <T	.001 <T	.001 <T	.001 <T	.001 <T	.	.002 <T	.	.002 <T
1992 OCT	.017	.002 <T	.002 <T	.004 <T	.002 <T	.002 <T	.	.002 <T	.	.002 <T
1992 DEC	.019	.001 <T	.001 <T	.	.	.	.	.002 <T	.	.002 <T
NITRATE (TOTAL) (MG/L)			DET'N LIMIT = 0.005		GUIDELINE = 10.0 (A1)		DET'N LIMIT = 0.005		GUIDELINE = 10.0 (A1)	
1991 JAN	2.940	2.870	2.880	2.850	2.840	2.850	2.840	2.840	2.930	2.930
1991 FEB	1.400	1.360	1.410	1.380	1.380	1.380	1.380	1.380	1.430	1.430
1991 MAR	1.010	1.030	1.030	1.030	1.070	1.030	1.070	1.070	1.200	1.200
1991 APR	1.150	1.130	1.130	1.140	1.130	1.140	1.130	1.130	1.140	1.140
1991 MAY	.925	.965	.980	.985	.995	.985	.995	.995	1.050	1.050
1991 JUN	2.570	2.880	2.900	2.860	2.890	2.860	2.890	2.890	2.880	2.880
1991 JUL	.070	.140	.130	.125	.130	.125	.130	.130	.175	.175
1991 SEP	.345	.115	.115	.120	.110	.120	.110	.110	.120	.120
1991 NOV	.175	.185	.185	.185	.185	.185	.185	.185	.200	.200
1992 FEB	1.290	1.150	1.210	1.140	.	1.140	.	.945	.	.965
1992 APR	.945	.935	.095	.080	.945	.080	.945	.945	.965	.965
1992 JUN	.055	.085	.085	.080	.	.080	.	.545	.	.555
1992 AUG	.525	.560	.	.	.545	.	.545	.545	.555	.555
1992 OCT	.410	.470	.475	.470	.	.470	.	.	.	.
1992 DEC	2.590	2.710	.	.	2.750	.	2.750	2.750	2.780	2.780

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (LABORATORY)					
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = 0.02		GUIDELINE = N/A	
1991 JAN	.740	.410	.450	.420	.520
1991 FEB	.730	.440	.430	.390	.440
1991 MAR	1.300	.840	.860	.880	.910
1991 APR	.800	.320	.330	.330	.390
1991 MAY	.780	.400	.460	.500	.470
1991 JUN	.980	.690	.570	.590	.780
1991 JUL	.780	.490	.490	.480	.570
1991 SEP	.810	.450	.460	.450	.400
1991 NOV	.670	.350	.370	.380	.430
1992 FEB	.720	.580	.650	.560	.430
1992 APR	1.030	.460	.	.	.530
1992 JUN	.900	.500	.490	.480	.410
1992 AUG	.900	.400	.	.	.
1992 OCT	.740	.470	.480	.480	.570
1992 DEC	.800	.540	.	.	.
PH (DMNSLESS)					
		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
1991 JAN	8.400	7.970	8.020	8.050	8.070
1991 FEB	8.070	7.750	7.840	7.760	7.860
1991 MAR	8.080	7.770	7.820	7.670	7.830
1991 APR	8.150	7.690	7.600	7.580	7.670
1991 MAY	8.430	7.960	8.030	7.980	8.130
1991 JUN	8.160	7.650	7.840	7.780	7.960
1991 JUL	8.460	7.870	7.960	7.890	8.170
1991 SEP	8.340	8.280	8.150	8.140	8.250
1991 NOV	8.360	7.870	7.920	7.910	7.970
1992 FEB	8.580	8.510	8.510	8.540	.
1992 APR	8.080	7.690	.	.	7.830
1992 JUN	8.430	8.130	8.210	8.170	.
1992 AUG	8.410	7.980	.	.	8.090
1992 OCT	8.350	7.860	7.880	7.870	.
1992 DEC	8.260	7.660	.	.	7.750

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHEMISTRY (LABORATORY)					
PHOSPHORUS FIL REACT (MG/L)		DET'N LIMIT = 0.0005		GUIDELINE = N/A	
1991 JAN	.026	.001 <T			
1991 FEB	.026	.001 <T			
1991 MAR	.121	.001 <T			
1991 APR	.036	.001 <T			
1991 MAY	.034	BDL			
1991 JUN	.073	.001 <T			
1991 JUL	.026	.002 <T			
1991 SEP	.041	.000 <T			
1991 NOV	.017	.000 <T			
1992 FEB	.046	BDL			
1992 APR	.162	.001 <T			
1992 JUN	.054	.001 <T			
1992 AUG	.030	BDL			
1992 OCT	.021	BDL			
1992 DEC	.016	BDL			
PHOSPHORUS TOTAL (MG/L)					
		DET'N LIMIT = 0.002		GUIDELINE = 0.40 (F2)	
1991 JAN	.039	.004 <T			
1991 FEB	.038	BDL			
1991 MAR	.179	.007 <T			
1991 APR	.083	.004 <T			
1991 MAY	.113	.004 <T			
1991 JUN	.112	.004 <T			
1991 JUL	.069	.007 <T			
1991 SEP	.075	.005 <T			
1991 NOV	.069	.005 <T			
1992 FEB	.063	.003 <T			
1992 APR	.225	.008 <T			
1992 JUN	.110	.005 <T			
1992 AUG	.081	.010			
1992 OCT	.075	.005 <T			
1992 DEC	.036	.004 <T			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW		DIST. SYSTEM LAVAL ST N STANDING		DIST. SYSTEM ST ANNE FREE FLOW		DIST. SYSTEM ST ANNE STANDING	
CHEMISTRY (LABORATORY)										
RESIDUE FILTRATE (MG/L)			DET'N LIMIT = N/A		GUIDELINE = 500 (A3)					
1991 JAN	391.000 CRO	385.000 CRO	384.000 CRO	384.000 CRO	384.000 CRO	375.000 CRO	370.000 CRO	370.000 CRO	370.000 CRO	370.000 CRO
1991 FEB	498.000 CRO	505.000 CRO	506.000 CRO	506.000 CRO	507.000 CRO	506.000 CRO	512.000 CRO	512.000 CRO	512.000 CRO	512.000 CRO
1991 MAR	156.000 CRO	166.000 CRO	163.000 CRO	163.000 CRO	167.000 CRO	176.000 CRO	42.400 CRO	42.400 CRO	42.400 CRO	42.400 CRO
1991 APR	255.000 CRO	256.000 CRO	255.000 CRO	255.000 CRO	253.000 CRO	252.000 CRO	248.000 CRO	248.000 CRO	248.000 CRO	248.000 CRO
1991 MAY	325.000 CRO	343.000 CRO	344.000 CRO	344.000 CRO	343.000 CRO	343.000 CRO	342.000 CRO	342.000 CRO	342.000 CRO	342.000 CRO
1991 JUN	324.000 CRO	342.000 CRO	340.000 CRO	340.000 CRO	340.000 CRO	340.000 CRO	340.000 CRO	340.000 CRO	340.000 CRO	340.000 CRO
1991 JUL	370.000 CRO	389.000 CRO	387.000 CRO	387.000 CRO	387.000 CRO	386.000 CRO	387.000 CRO	387.000 CRO	387.000 CRO	387.000 CRO
1991 SEP	349.000 CRO	367.000 CRO	369.000 CRO	369.000 CRO	369.000 CRO	369.000 CRO	369.000 CRO	369.000 CRO	369.000 CRO	369.000 CRO
1991 NOV	403.000 CRO	419.000 CRO	419.000 CRO	419.000 CRO	418.000 CRO	419.000 CRO	421.000 CRO	421.000 CRO	421.000 CRO	421.000 CRO
1992 FEB	616.000	628.000	634.000	634.000	630.000	170.000 CRO	169.000 CRO	169.000 CRO	169.000 CRO	169.000 CRO
1992 APR	152.000 CRO	170.000 CRO	405.000 CRO	405.000 CRO	403.000 CRO	490.000 CRO	493.000 CRO	493.000 CRO	493.000 CRO	493.000 CRO
1992 JUN	381.000 CRO	404.000 CRO	415.000 CRO	415.000 CRO	415.000 CRO	439.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO
1992 AUG	439.000 CRO	482.000 CRO	415.000 CRO	415.000 CRO	415.000 CRO	439.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO
1992 OCT	415.000 CRO	415.000 CRO	415.000 CRO	415.000 CRO	415.000 CRO	439.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO
1992 DEC	472.000 CRO	437.000 CRO	415.000 CRO	415.000 CRO	415.000 CRO	439.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO	440.000 CRO
SULPHATE (MG/L)			DET'N LIMIT = 0.20		GUIDELINE = 500 (A3)					
1991 JAN	65.320	106.700	107.350	107.350	103.400	104.150	99.000	99.000	99.000	99.000
1991 FEB	75.920	108.200	106.400	106.400	103.900	108.500	108.800	108.800	108.800	108.800
1991 MAR	11.540	53.650	53.730	53.730	53.760	56.080	62.490	62.490	62.490	62.490
1991 APR	26.240	67.200	67.950	67.950	66.740	66.360	66.740	66.740	66.740	66.740
1991 MAY	35.550	84.720	84.680	84.680	84.860	84.770	84.970	84.970	84.970	84.970
1991 JUN	31.460	76.180	77.240	77.240	77.990	77.280	77.240	77.240	77.240	77.240
1991 JUL	39.860	81.220	79.340	79.340	81.040	81.150	81.210	81.210	81.210	81.210
1991 SEP	41.090	90.650	92.980	92.980	91.540	91.580	92.000	92.000	92.000	92.000
1991 NOV	52.030	103.960	104.060	104.060	102.230	104.520	106.040	106.040	106.040	106.040
1992 FEB	144.010	187.450	183.090	183.090	182.610	60.100	61.160	61.160	61.160	61.160
1992 APR	32.150	42.300	101.940	101.940	102.930	49.500	48.920	48.920	48.920	48.920
1992 JUN	60.320	96.780	98.270	98.270	99.050	110.880	106.850	106.850	106.850	106.850
1992 AUG	63.050	53.500	98.670	98.670	99.050	110.880	106.850	106.850	106.850	106.850
1992 OCT	57.060	98.670	98.670	98.670	99.050	110.880	106.850	106.850	106.850	106.850
1992 DEC	83.090	109.830	98.670	98.670	99.050	110.880	106.850	106.850	106.850	106.850

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TURBIDITY (FTU)	CHEMISTRY (LABORATORY)		DET'N LIMIT = 0.05		GUIDELINE = 1.0 (A1)	
	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
1991 JAN	9.100	.450	.440	.410	1.120 RRV	1.170 RRV
1991 FEB	8.900	1.260	.650	.380	.500	.480
1991 MAR	28.000	.430	.470	.590	.620	.640
1991 APR	27.000	.400	.400	.330	.610	.660
1991 MAY	35.000	.540	.620	.440	.610	.850
1991 JUN	16.100	.490	.730	.510	.550	.590
1991 JUL	7.700	.340	.410	.360	.340	.490
1991 SEP	6.300	.390	.400	.390	.470	.600
1991 NOV	12.000	.250	.270	.250	.280	.500
1992 FEB	8.700	.180 <T	.310	.150 <T	.	.
1992 APR	55.000	.300	.	.	.310	.530
1992 JUN	29.000	.820	.700	.710	.	.
1992 AUG	14.400	.370	.	.	.410	.480
1992 OCT	13.200	.460	.290	.490	.	.
1992 DEC	9.500	.610	.	.	.780	.670

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS								
SILVER (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = N/A			
1991 JAN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 MAR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 MAY	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 JUL	BDL	BDL	.070 <T	BDL	BDL	BDL	BDL	BDL
1991 SEP	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 NOV	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 APR	.090 <T	.080 <T	BDL	BDL	BDL	BDL	.080 <T	.070 <T
1992 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
ALUMINUM (UG/L)								
			DET'N LIMIT = 0.10		GUIDELINE = 100 (A4)			
1991 JAN	140.000	86.000	80.000	86.000	130.000	130.000	130.000	130.000
1991 FEB	140.000	51.000	43.000	51.000	47.000	47.000	47.000	47.000
1991 MAR	490.000	49.000	43.000	49.000	41.000	47.000	51.000	51.000
1991 APR	490.000	69.000	70.000	68.000	74.000	74.000	79.000	79.000
1991 MAY	520.000	49.000	43.000	45.000	38.000	38.000	40.000	40.000
1991 JUN	260.000	58.000	54.000	47.000	51.000	51.000	53.000	53.000
1991 JUL	520.000	64.000	59.000	59.000	62.000	62.000	66.000	66.000
1991 SEP	42.000	51.000	48.000	46.000	45.000	45.000	47.000	47.000
1991 NOV	490.000	31.000	33.000	28.000	36.000	36.000	37.000	37.000
1992 APR	780.000	44.000	73.000	46.000	43.000	43.000	43.000	43.000
1992 JUN	340.000	110.000	97.000	100.000	41.000	41.000	41.000	41.000
1992 AUG	.410 <T	52.000	35.000	34.000	160.000	160.000	160.000	160.000
1992 OCT	260.000	36.000	35.000	34.000	160.000	160.000	160.000	160.000
1992 DEC	190.000	160.000	35.000	34.000	160.000	160.000	160.000	160.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM		DIST. SYSTEM		DIST. SYSTEM	
		LAVAL ST N FREE FLOW	LAVAL ST N STANDING	ST ANNE FREE FLOW	ST ANNE STANDING	ST ANNE STANDING	
METALS							
ARSENIC (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 25 (A1)			
1991 JAN	.550 <T	.270 <T	.220 <T	.140 <T	.180 <T	.270 <T	
1991 FEB	BDL	BDL	BDL	BDL	BDL	BDL	
1991 MAR	.160 <T	BDL	BDL	BDL	BDL	BDL	
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL	
1991 MAY	.630 <T	.430 <T	.190 <T	.440 <T	.140 <T	.240 <T	
1991 JUN	.400 <T	.130 <T	BDL	BDL	.330 <T	BDL	
1991 JUL	1.300	.560 <T	.530 <T	.560 <T	.340 <T	.410 <T	
1991 SEP	1.300	.530 <T	.650 <T	.390 <T	.520 <T	.480 <T	
1991 NOV	.820 <T	.410 <T	.350 <T	.320 <T	.520 <T	.400 <T	
1992 FEB	.430 <T	.330 <T	.280 <T	.150 <T	.770 <T	.750 <T	
1992 APR	1.000 <T	.700 <T	BDL	.110 <T	.860 <T	1.100	
1992 JUN	.770 <T	BDL	BDL	.910 <T	BDL	BDL	
1992 AUG	.250 <T	1.400	.880 <T	.	.	.	
1992 OCT	1.200	.790 <T	.	.	.	.	
1992 DEC	BDL	.210 <T	.	.	.	.	
BARIUM (UG/L)							
		DET'N LIMIT = 0.05		GUIDELINE = 1000 (A2)			
1991 JAN	58.000	37.000	37.000	37.000	39.000	37.000	
1991 FEB	99.000	66.000	64.000	62.000	62.000	59.000	
1991 MAR	30.000	32.000	31.000	32.000	31.000	34.000	
1991 APR	44.000	32.000	32.000	33.000	31.000	31.000	
1991 MAY	53.000	40.000	38.000	40.000	40.000	40.000	
1991 JUN	48.000	43.000	43.000	40.000	42.000	44.000	
1991 JUL	50.000	45.000	45.000	45.000	43.000	42.000	
1991 SEP	43.000	42.000	43.000	43.000	43.000	43.000	
1991 NOV	62.000	48.000	50.000	50.000	50.000	47.000	
1992 FEB	120.000	93.000	94.000	93.000	25.000	25.000	
1992 APR	35.000	25.000	52.000	53.000	80.000	78.000	
1992 JUN	63.000	55.000	52.000	52.000	39.000	41.000	
1992 AUG	70.500	75.000	52.000	52.000	.	.	
1992 OCT	72.000	53.000	52.000	52.000	.	.	
1992 DEC	72.000	40.000	40.000	40.000	.	.	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N STANDING		DIST. SYSTEM ST ANNE FREE FLOW		DIST. SYSTEM ST ANNE STANDING			
METALS												
BORON (UG/L)		DET'N LIMIT = 2.00									GUIDELINE = 5000 (A1)	
1991 JAN	34.000	33.000	31.000	31.000	31.000	25.000	30.000					
1991 FEB	32.000	51.000	41.000	46.000	46.000	50.000	40.000					
1991 MAR	9.800 <T	11.000 <T	12.000 <T	12.000 <T	12.000 <T	12.000 <T	15.000 <T					
1991 APR	24.000	23.000	23.000	24.000	24.000	18.000 <T	15.000 <T					
1991 MAY	24.000	26.000	26.000	26.000	26.000	25.000	26.000					
1991 JUN	29.000	34.000	36.000	32.000	32.000	32.000	29.000					
1991 JUL	43.000	47.000	47.000	47.000	47.000	35.000	44.000					
1991 SEP	71.000	67.000	66.000	63.000	63.000	65.000	64.000					
1991 NOV	63.000	55.000	56.000	55.000	55.000	57.000	62.000					
1992 FEB	43.000	46.000	46.000	47.000	47.000	.	.					
1992 APR	11.000 <T	12.000 <T	.	.	38.000	14.000 <T	13.000 <T					
1992 JUN	33.000	37.000	37.000	37.000	38.000	91.000	86.000					
1992 AUG	5.790 <T	90.000	.	.	56.000	.	.					
1992 OCT	51.000	55.000	55.000	55.000	56.000	29.000	32.000					
1992 DEC	36.000	32.000	.	.	.	.	.					
BERYLLIUM (UG/L)												
DET'N LIMIT = 0.05												
GUIDELINE = 6800 (D4)												
1991 JAN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1991 FEB	BDL	.090 <T	BDL	BDL	.060 <T	BDL	BDL	BDL				
1991 MAR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1991 MAY	.100 <T	.070 <T	.080 <T	.060 <T	.060 <T	.060 <T	BDL	BDL				
1991 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1991 JUL	BDL	.060 <T	BDL	BDL	BDL	BDL	BDL	BDL				
1991 SEP	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1991 NOV	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1992 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1992 APR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL				
1992 JUN	BDL	BDL	BDL	BDL	.080 <T	BDL	BDL	BDL				
1992 AUG	.100 <T	BDL	.	.	BDL	BDL	BDL	BDL				
1992 OCT	BDL	.060 <T	.070 <T	.080 <T	.080 <T	.060 <T	BDL	BDL				
1992 DEC	BDL	.060 <T	.	.	.	.060 <T	BDL	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT -RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
METALS						
CADMIUM (UG/L)		DET'N LIMIT = 0.05 GUIDELINE = 5.0 (A1)				
1991 JAN	BDL	BDL	BDL	BDL	BDL	.070 <T
1991 FEB	BDL	BDL	.070 <T	.110 <T	.110 <T	.120 <T
1991 MAR	BDL	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL
1991 MAY	BDL	BDL	BDL	BDL	.060 <T	.060 <T
1991 JUN	.060 <T	.060 <T	BDL	.090 <T	.080 <T	.090 <T
1991 JUL	.200 <T	.120 <T	.120 <T	.120 <T	.060 <T	.060 <T
1991 SEP	BDL	BDL	BDL	BDL	BDL	.150 <T
1991 NOV	BDL	BDL	.100 <T	1.100 <T	BDL	.100 <T
1992 FEB	.110 <T	.090 <T	.100 <T	.100 <T	.200 <T	.250 <T
1992 APR	.160 <T	.220 <T	.	.	.	.
1992 JUN	BDL	BDL	BDL	BDL	.060 <T	.070 <T
1992 AUG	.110 <T	.080 <T	.	.	.	.
1992 OCT	BDL	.070 <T	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	.	.	BDL	BDL
COBALT (UG/L)		DET'N LIMIT = 0.02 GUIDELINE = N/A				
1991 JAN	.280 <T	.200 <T	.240 <T	.190 <T	.230 <T	.210 <T
1991 FEB	.310 <T	.190 <T	.180 <T	.130 <T	.190 <T	.250 <T
1991 MAR	.380 <T	.080 <T	.070 <T	.060 <T	.070 <T	.130 <T
1991 APR	.640 <T	.230 <T	.230 <T	.230 <T	.220 <T	.220 <T
1991 MAY	.540 <T	BDL	.100 <T	.150 <T	.050 <T	.050 <T
1991 JUN	.520 <T	.370 <T	.430 <T	.380 <T	.400 <T	.430 <T
1991 JUL	BDL	BDL	BDL	BDL	BDL	BDL
1991 SEP	.070 <T	.140 <T	.150 <T	.160 <T	.120 <T	.130 <T
1991 NOV	.320 <T	.100 <T	.220 <T	.230 <T	.200 <T	.150 <T
1992 FEB	.230 <T	.140 <T	.200 <T	.230 <T	.	.
1992 APR	.920 <T	.370 <T	.	.	.330 <T	.420 <T
1992 JUN	.590 <T	.280 <T	.270 <T	.290 <T	.	.
1992 AUG	1.030	.530 <T	.	.	.440 <T	.480 <T
1992 OCT	.580 <T	1.100	1.100	1.100	.	.
1992 DEC	.310 <T	.240 <T	.	.	.150 <T	.280 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
		FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS									
CHROMIUM (UG/L)		DET'N LIMIT = 0.50				GUIDELINE = 50.0 (A1)			
1991 JAN	4.200 <T	3.200 <T	3.100 <T	2.800 <T	.730 <T	2.600 <T			
1991 FEB	1.100 <T	5.600	2.400 <T	4.300 <T	5.200	2.400 <T			
1991 MAR	2.100 <T	.620 <T	1.100 <T	1.000 <T	.930 <T	1.200 <T			
1991 APR	5.300	3.900 <T	3.500 <T	3.400 <T	1.400 <T	BDL			
1991 MAY	2.100 <T	.780 <T	.730 <T	.760 <T	.690 <T	.910 <T			
1991 JUN	1.300 <T	1.700 <T	1.800 <T	1.900 <T	BDL	.560 <T			
1991 JUL	3.200 <T	4.400 <T	3.900 <T	3.900 <T	BDL	3.600 <T			
1991 SEP	3.900 <T	2.900 <T	2.100 <T	2.200 <T	2.000 <T	1.900 <T			
1991 NOV	1.100 <T	BDL	.680 <T	.560 <T	BDL	.520 <T			
1992 FEB	.700 <T	BDL	BDL	BDL	BDL	BDL			
1992 APR	2.000 <T	BDL	BDL	.530 <T	BDL	BDL			
1992 JUN	1.300 <T	BDL	BDL	BDL	9.100	7.700			
1992 AUG	3.540 <T	8.400	BDL	BDL	BDL	BDL			
1992 OCT	4.100 <T	4.700 <T	4.600 <T	4.700 <T	BDL	BDL			
1992 DEC	4.000 <T	3.300 <T	BDL	BDL	1.200 <T	3.100 <T			
COPPER (UG/L)									
		DET'N LIMIT = 0.50				GUIDELINE = 1000 (A3)			
1991 JAN	1.400 <T	1.500 <T	5.400	140.000	9.800	140.000			
1991 FEB	1.800 <T	2.100 <T	7.300	180.000	9.600	220.000			
1991 MAR	1.800 <T	1.700 <T	11.000	81.000	10.000	130.000			
1991 APR	1.800 <T	2.000 <T	11.000	71.000	11.000	150.000			
1991 MAY	2.900 <T	2.900 <T	13.000	27.000	18.000	84.000			
1991 JUN	2.100 <T	2.600 <T	7.000	13.000	8.600	110.000			
1991 JUL	2.700 <T	2.500 <T	11.000	120.000	15.000	44.000			
1991 SEP	1.600 <T	8.500	30.000	37.000	15.000	100.000			
1991 NOV	4.300 <T	2.900 <T	30.000	2700.000	18.000	180.000			
1992 FEB	1.800 <T	2.200 <T	37.000	1600.000	BDL	BDL			
1992 APR	2.800 <T	2.400 <T	BDL	BDL	38.000	150.000			
1992 JUN	2.800 <T	2.700 <T	39.000	39.000	BDL	BDL			
1992 AUG	5.210	2.600 <T	BDL	BDL	57.000	52.000			
1992 OCT	1.800 <T	2.000 <T	23.000	57.000	BDL	BDL			
1992 DEC	1.800 <T	2.300 <T	BDL	BDL	11.000	32.000			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS										
IRON (UG/L)			DET'N LIMIT = 6.00		GUIDELINE = 300 (A3)					
1991 JAN	190.000	BDL	BDL	BDL	BDL	20.000 <T	10.000 <T			
1991 FEB	240.000	BDL	BDL	BDL	BDL	7.000 <T	11.000 <T			
1991 MAR	620.000	7.100 <T	BDL	BDL	BDL	32.000 <T	34.000 <T			
1991 APR	610.000	BDL	BDL	BDL	BDL	13.000 <T	17.000 <T			
1991 MAY	810.000	6.200 <T	6.400 <T	7.100 <T	BDL	BDL	BDL			
1991 JUN	350.000	9.700 <T	BDL	BDL	BDL	13.000 <T	22.000 <T			
1991 JUL	270.000	BDL	BDL	11.000 <T	BDL	11.000 <T	8.000 <T			
1991 SEP	BDL	7.700 <T	6.400 <T	BDL	BDL	14.000 <T	16.000 <T			
1991 NOV	380.000	BDL	BDL	BDL	BDL	24.000 <T	16.000 <T			
1992 FEB	240.000	BDL	BDL	BDL	BDL	21.000 <T	15.000 <T			
1992 APR	950.000	13.000 <T	7.900 <T	6.200 <T	BDL	BDL	BDL			
1992 JUN	450.000	18.000 <T	BDL	BDL	BDL	8.100 <T	7.600 <T			
1992 AUG	535.000	BDL	BDL	BDL	BDL					
1992 OCT	290.000	BDL	BDL	BDL	BDL					
1992 DEC	230.000	BDL	BDL	BDL	BDL					
MERCURY (UG/L)			DET'N LIMIT = 0.02		GUIDELINE = 1.0 (A1)					
1991 JAN	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 MAR	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 MAY	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 JUL	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 SEP	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 NOV	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1992 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1992 APR	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1992 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1992 AUG	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1992 OCT	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1992 DEC	BDL	BDL	BDL	BDL	BDL	BDL	BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS										
MANGANESE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 50.0 (A3)					
1991 JAN	21.000	15.000	11.000	14.000	13.000	12.000	13.000	12.000	13.000	12.000
1991 FEB	44.000	33.000	21.000	30.000	25.000	26.000	31.000	26.000	25.000	26.000
1991 MAR	41.000	29.000	30.000	30.000	31.000	32.000	5.300	32.000	31.000	32.000
1991 APR	41.000	5.000	5.200	5.700	5.300	6.900	5.300	6.900	5.300	6.900
1991 MAY	84.000	23.000	13.000	13.000	15.000	17.000	15.000	17.000	15.000	17.000
1991 JUN	72.000	16.000	13.000	6.000	11.000	13.000	11.000	13.000	11.000	13.000
1991 JUL	60.000	61.000	34.000	36.000	38.000	38.000	7.500	38.000	7.500	8.200
1991 SEP	400 <T	9.400	8.100	7.800	5.000	5.700	5.000	5.700	5.000	5.700
1991 NOV	51.000	5.700	4.900	8.600	43.000	43.000	43.000	43.000	43.000	43.000
1992 FEB	79.000	72.000	71.000	68.000	8.100	7.800	8.100	7.800	8.100	7.800
1992 APR	78.000	42.000	27.000	28.000	7.300	7.300	7.300	7.300	7.300	7.300
1992 JUN	150.000	31.000	6.800	6.700	7.300	7.300	7.300	7.300	7.300	7.300
1992 AUG	66.170	14.000	6.800	6.700	7.300	7.300	7.300	7.300	7.300	7.300
1992 OCT	45.000	7.900	6.800	6.700	7.300	7.300	7.300	7.300	7.300	7.300
1992 DEC	19.000	12.000	6.800	6.700	7.300	7.300	7.300	7.300	7.300	7.300
MOLYBDENUM (UG/L)										
			DET'N LIMIT = 0.05		GUIDELINE = N/A					
1991 JAN	1.900	1.900	2.000	1.900	2.000	1.800	2.000	1.800	2.000	1.800
1991 FEB	4.000	4.800	4.600	4.500	4.600	4.600	4.600	4.600	4.600	4.600
1991 MAR	260 <T	520	490 <T	540	560	900	560	900	560	900
1991 APR	720	1.100	1.000	1.100	1.000	950	1.000	950	1.000	950
1991 MAY	1.700	2.500	2.400	2.500	2.700	2.500	2.700	2.500	2.700	2.500
1991 JUN	1.100	1.200	1.400	1.200	1.300	1.300	1.300	1.300	1.300	1.300
1991 JUL	3.200	2.700	2.800	2.700	2.600	2.800	2.600	2.800	2.600	2.800
1991 SEP	3.600	3.000	3.100	3.000	3.100	3.100	3.100	3.100	3.100	3.100
1991 NOV	2.700	3.000	3.200	3.000	3.300	3.000	3.300	3.000	3.300	3.000
1992 FEB	11.000	11.000	11.000	11.000	890	840	890	840	890	840
1992 APR	520	860	3.200	3.400	6.100	6.300	6.100	6.300	6.100	6.300
1992 JUN	1.400	2.700	2.300	2.200	1.900	2.000	1.900	2.000	1.900	2.000
1992 AUG	4.000	5.700	2.300	2.200	1.900	2.000	1.900	2.000	1.900	2.000
1992 OCT	2.300	2.100	2.300	2.200	1.900	2.000	1.900	2.000	1.900	2.000
1992 DEC	2.500	1.700	2.300	2.200	1.900	2.000	1.900	2.000	1.900	2.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS										
NICKEL (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 350 (03)						
1991 JAN	.300 <T	.510 <T	.300 <T	1.200 <T	BDL	2.700	2.700			
1991 FEB	1.400 <T	1.700 <T	1.600 <T	3.500	1.400 <T	4.900	4.900			
1991 MAR	BDL	BDL	BDL	BDL	BDL	1.400 <T	1.400 <T			
1991 APR	1.100 <T	.530 <T	.890 <T	1.100 <T	.870 <T	1.700 <T	1.700 <T			
1991 MAY	.760 <T	BDL	BDL	BDL	.440 <T	1.900 <T	1.900 <T			
1991 JUN	2.000 <T	1.900 <T	2.500	2.400	2.300	4.100	4.100			
1991 JUL	BDL	BDL	BDL	BDL	BDL	BDL	BDL			
1991 SEP	.500 <T	2.500	.270 <T	.420 <T	.210 <T	1.900 <T	1.900 <T			
1991 NOV	1.300 <T	1.100 <T	1.000 <T	6.100	1.300 <T	7.100	7.100			
1992 FEB	BDL	BDL	BDL	BDL						
1992 APR	2.900	2.300			2.300	4.300	4.300			
1992 JUN	.970 <T	.490 <T	BDL	BDL						
1992 AUG	.500 <T	2.900			1.900 <T	2.200	2.200			
1992 OCT	4.500	7.100	6.700	6.700						
1992 DEC	BDL	BDL			BDL	BDL	BDL			
LEAD (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 10 (A1)						
1991 JAN	.270 <T	.180 <T	.410 <T	5.400	.280 <T	2.400	2.400			
1991 FEB	.340 <T	.140 <T	.310 <T	8.200	.350 <T	4.400	4.400			
1991 MAR	.560	.060 <T	.410 <T	3.200	.130 <T	1.900	1.900			
1991 APR	.470 <T	.190 <T	.590	4.400	.320 <T	3.600	3.600			
1991 MAY	.880	.250 <T	.580	2.000	.370 <T	1.600	1.600			
1991 JUN	.470 <T	.310 <T	.600	1.100	.460 <T	3.300	3.300			
1991 JUL	.870	.450 <T	.830	6.100	.650	1.600	1.600			
1991 SEP	BDL	2.600	2.000	3.800	.910	3.400	3.400			
1991 NOV	.850	.300 <T	2.200	100.000	.740	4.000	4.000			
1992 FEB	.370 <T	.200 <T	.680	13.000						
1992 APR	.970	.430 <T			.860	2.700	2.700			
1992 JUN	.760	.320 <T	.790	.720						
1992 AUG	.750	.520			1.400	1.800	1.800			
1992 OCT	.420 <T	.290 <T	.430 <T	.720						
1992 DEC	.250 <T	.230 <T			.430 <T	1.100	1.100			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS										
ANTIMONY (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 146 (D4)					
1991 JAN	.250 <T	.270 <T	.290 <T	.320 <T	.380 <T	.440 <T				
1991 FEB	.230 <T	.390 <T	.430 <T	.490 <T	.500 <T	.470 <T				
1991 MAR	.280 <T	.530	.430 <T	.540	.510	.560				
1991 APR	.360 <T	.470 <T	.530	.590	.500 <T	.480 <T				
1991 MAY	.480 <T	.450 <T	.550	.430 <T	.510	.450 <T				
1991 JUN	.320 <T	.510	.520	.500 <T	.470 <T	.520				
1991 JUL	.500 <T	.750	.770	.700	.550	.560				
1991 SEP	.330 <T	.390 <T	.450 <T	.460 <T	.400 <T	.510				
1991 NOV	.350 <T	.590	.520	.690	.580	.620				
1992 FEB	.420 <T	.580	.510	.680	.470 <T	.520				
1992 APR	.310 <T	.420 <T	.450 <T	.510	.540	.700				
1992 JUN	.320 <T	.400 <T	.400 <T	.400 <T	.500 <T	.450 <T				
1992 AUG	.360 <T	.700	.400 <T	.400 <T	.500 <T	.450 <T				
1992 OCT	.380 <T	.420 <T	.400 <T	.400 <T	.500 <T	.450 <T				
1992 DEC	.430 <T	.440 <T	.400 <T	.400 <T	.500 <T	.450 <T				
SELENIUM (UG/L)			DET'N LIMIT = 1.00		GUIDELINE = 10 (A1)					
1991 JAN	BDL	BDL	BDL	BDL	BDL	BDL				
1991 FEB	BDL	1.100 <T	1.100 <T	BDL	1.200 <T	1.600 <T				
1991 MAR	BDL	BDL	BDL	BDL	BDL	BDL				
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL				
1991 MAY	BDL	BDL	BDL	BDL	BDL	BDL				
1991 JUN	BDL	1.100 <T	BDL	BDL	BDL	1.200 <T				
1991 JUL	1.300 <T	2.200 <T	2.200 <T	1.800 <T	BDL	1.100 <T				
1991 SEP	BDL	1.600 <T	1.300 <T	BDL	1.200 <T	BDL				
1991 NOV	1.800 <T	2.100 <T	2.000 <T	1.900 <T	2.300 <T	2.000 <T				
1992 FEB	BDL	1.200 <T	BDL	BDL	.4500 <T	.4300 <T				
1992 APR	3.900 <T	4.200 <T	.4500 <T	.4500 <T	.4500 <T	.4300 <T				
1992 JUN	BDL	BDL	BDL	1.100 <T	.4500 <T	.4300 <T				
1992 AUG	BDL	1.700 <T	.4500 <T	.4500 <T	.4500 <T	.4300 <T				
1992 OCT	BDL	2.900 <T	3.200 <T	.4500 <T	.4500 <T	.4300 <T				
1992 DEC	BDL	BDL	.4500 <T	.4500 <T	.4500 <T	.4300 <T				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE STANDING
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	
METALS									
STRONTIUM (UG/L)									
DET'N LIMIT = 0.10									
GUIDELINE = N/A									
1991 JAN	500.000	430.000	430.000	450.000	450.000	450.000	430.000	430.000	
1991 FEB	810.000	830.000	790.000	780.000	790.000	790.000	740.000	740.000	
1991 MAR	150.000	170.000	170.000	180.000	180.000	190.000	240.000	240.000	
1991 APR	310.000	250.000	250.000	250.000	250.000	250.000	240.000	240.000	
1991 MAY	470.000	460.000	440.000	450.000	450.000	450.000	450.000	450.000	
1991 JUN	460.000	440.000	440.000	440.000	440.000	420.000	440.000	440.000	
1991 JUL	630.000	600.000	590.000	600.000	600.000	550.000	570.000	570.000	
1991 SEP	620.000	600.000	610.000	610.000	610.000	610.000	620.000	620.000	
1991 NOV	840.000	780.000	750.000	770.000	770.000	800.000	810.000	810.000	
1992 FEB	890.000	880.000	880.000	870.000	870.000	.	140.000	140.000	
1992 APR	150.000	140.000	580.000	580.000	580.000	790.000	760.000	760.000	
1992 JUN	600.000	600.000	600.000	600.000	600.000	550.000	550.000	550.000	
1992 AUG	692.000	760.000	680.000	680.000	680.000	.	.	.	
1992 OCT	780.000	670.000	.	.	.	.	.	.	
1992 DEC	640.000	550.000	.	.	.	.	.	.	
TITANIUM (UG/L)									
DET'N LIMIT = 0.50									
GUIDELINE = N/A									
1991 JAN	18.000	7.900	8.000	8.900	9.200	8.000	8.000	8.000	
1991 FEB	22.000	14.000	13.000	14.000	14.000	14.000	14.000	14.000	
1991 MAR	28.000	5.600	5.300	5.600	5.700	5.700	6.800	6.800	
1991 APR	28.000	8.700	8.100	8.400	8.200	8.200	7.600	7.600	
1991 MAY	29.000	4.600 <T	4.800 <T	4.200 <T	4.800 <T	4.800 <T	4.800 <T	4.800 <T	
1991 JUN	22.000	8.400	8.400	8.400	7.400	7.400	7.800	7.800	
1991 JUL	19.000	5.400	5.200	5.100	4.300 <T	4.300 <T	4.400 <T	4.400 <T	
1991 SEP	2.300 <T	1.700 <T	1.700 <T	1.900 <T	2.000 <T	2.000 <T	1.700 <T	1.700 <T	
1991 NOV	15.000	1.700 <T	1.600 <T	1.700 <T	1.700 <T	1.700 <T	1.600 <T	1.600 <T	
1992 FEB	17.000	6.200	6.200	6.200	6.000	6.000	5.700	5.700	
1992 APR	33.000	6.100	3.000 <T	3.100 <T	6.000	6.000	8.600	8.600	
1992 JUN	16.000	3.800 <T	3.000 <T	3.100 <T	9.100	9.100	9.600	9.600	
1992 AUG	80L	9.500	.	7.000	7.000	7.000	.	.	
1992 OCT	21.000	7.000	7.100	7.000	9.100	9.100	.	.	
1992 DEC	21.000	9.100	.	.	.	.	.	.	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS										
THALLIUM (UG/L)			DET'N LIMIT = 0.05				GUIDELINE = 13 (D4)			
1991 JAN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 MAR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 MAY	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 JUL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 SEP	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1991 NOV	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 FEB	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1992 APR	.060 <T	.070 <T	.	.	.	.	.070 <T	.070 <T	.	.070 <T
1992 JUN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	.	BDL
1992 AUG	BDL	BDL	.	.	.	.	BDL	BDL	.	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	.	BDL
1992 DEC	BDL	BDL	.	.	.	.	BDL	BDL	.	BDL
URANIUM (UG/L)			DET'N LIMIT = 0.05				GUIDELINE = 100 (A1)			
1991 JAN	2.100	.620	.610	.600	.600	.550	.450 <T	.450 <T	.	.450 <T
1991 FEB	2.300	1.600	1.700	1.600	1.600	1.700	1.500	1.500	.	1.500
1991 MAR	.410 <T	BDL	BDL	BDL	BDL	BDL	.070 <T	.070 <T	.	.070 <T
1991 APR	.950	.120 <T	.120 <T	.100 <T	.100 <T	.130 <T	.110 <T	.110 <T	.	.110 <T
1991 MAY	1.300	.400 <T	.410 <T	.390 <T	.390 <T	.480 <T	.420 <T	.420 <T	.	.420 <T
1991 JUN	1.300	.390 <T	.380 <T	.420 <T	.420 <T	.430 <T	.420 <T	.420 <T	.	.420 <T
1991 JUL	1.500	.540	.480 <T	.520	.520	.470 <T	.430 <T	.430 <T	.	.430 <T
1991 SEP	1.500	.270 <T	.280 <T	.270 <T	.270 <T	.270 <T	.270 <T	.270 <T	.	.270 <T
1991 NOV	1.100	.220 <T	.210 <T	.240 <T	.240 <T	.220 <T	.240 <T	.240 <T	.	.240 <T
1992 FEB	2.500	1.300	1.400	1.300	1.300	.	.110 <T	.110 <T	.	.110 <T
1992 APR	.560	.100 <T	.470 <T	.500 <T	.500 <T	.960	.830	.830	.	.830
1992 JUN	1.300	.600	.600	.540	.540	.	.	.	.	.
1992 AUG	1.840	.800	.	.	.	.	.	.	.	.
1992 OCT	1.500	.560	.600	.540	.540	.	.	.	.	.
1992 DEC	2.200	1.200	.	.	.	1.200	1.200	1.200	.	1.200

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE STANDING
		FREE FLOW	STANDING	FREE FLOW	STANDING	
METALS						
VANADIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = N/A		
1991 JAN	.990	.460 <T	.430 <T	.410 <T	.440 <T	.540
1991 FEB	.510	BDL	BDL	BDL	.060 <T	.180 <T
1991 MAR	1.800	.240 <T	.220 <T	.220 <T	.200 <T	.310 <T
1991 APR	1.400	BDL	BDL	BDL	BDL	BDL
1991 MAY	2.300	.250 <T	.170 <T	.200 <T	.190 <T	.190 <T
1991 JUN	2.400	1.200	1.200	1.000	1.200	1.200
1991 JUL	3.300	1.500	1.200	1.300	1.400	1.300
1991 SEP	3.100	1.900	1.800	1.900	1.900	1.800
1991 NOV	2.100	.640	.740	.680	.670	.640
1992 FEB	1.000	.450 <T	.430 <T	.390 <T	.	.
1992 APR	2.600	.180 <T	.	.	.180 <T	.190 <T
1992 JUN	2.500	.500 <T	.310 <T	.380 <T	.	.
1992 AUG	2.000	1.600	.	.	1.500	1.600
1992 OCT	2.700	1.600	1.600	1.600	.	.
1992 DEC	1.200	.540	.	.	.470 <T	.520
ZINC (UG/L)						
ZINC (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 5000 (A3)		
1991 JAN	5.100	5.700	4.700	45.000	6.300	120.000
1991 FEB	7.500	6.300	6.800	180.000	6.200	100.000
1991 MAR	7.500	5.700	6.800	30.000	6.200	92.000
1991 APR	7.600	4.900	5.800	21.000	4.600	58.000
1991 MAY	9.000	6.100	8.100	19.000	6.100	12.000
1991 JUN	6.300	5.300	7.000	13.000	6.100	72.000
1991 JUL	8.600	4.300	7.000	49.000	7.200	16.000
1991 SEP	.320 <T	14.000	10.000	7.700	3.100	14.000
1991 NOV	7.400	4.500	9.200	730.000	7.900	180.000
1992 FEB	6.800	6.100	7.900	38.000	.	.
1992 APR	11.000	6.200	.	.	11.000	100.000
1992 JUN	3.900	3.700	3.600	3.500	.	.
1992 AUG	5.770	6.700	.	.	11.000	17.000
1992 OCT	4.800	4.500	4.500	8.600	.	.
1992 DEC	6.700	8.700	.	.	8.300	22.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHLOROAROMATICS					
HEXACHLOROBUTADIENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 450 (D4)	
43 SAMPLES	BDL	BDL	.	BDL	.
123-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
1234-TETChlorobenzene (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
1235-TETChlorobenzene (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
124-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 10000 (I)	
43 SAMPLES	BDL	BDL	.	BDL	.
1245-TETChlorobenzene (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 38000 (D4)	
43 SAMPLES	BDL	BDL	.	BDL	.
135-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
HEXACHLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 10 (C1)	
43 SAMPLES	BDL	BDL	.	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHLOROAROMATICS					
HEXACHLOROETHANE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = 1900 (04)	
1991 JAN	BDL	7.000 <T		4.000 <T	
1991 FEB	BDL	BDL		BDL	
1991 MAR	BDL	BDL		BDL	
1991 APR	BDL	1.000 <T		1.000 <T	
1991 MAY	BDL	6.000 <T		5.000 <T	
1991 JUN	BDL	4.000 <T		7.000 <T	
1991 JUL	IAW	IAW		IAW	
1991 SEP	IAW	IAW		IAW	
1991 NOV	BDL	BDL		BDL	
1992 APR	BDL	5.000 <T		5.000 <T	
1992 JUN	BDL	2.000 <T			
1992 AUG	BDL	4.000 <T		3.000 <T	
1992 OCT	BDL	4.000 <T			
1992 DEC	BDL	3.000 <T		3.000 <T	
OCTACHLOROSTYRENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL		BDL	
PENTACHLOROBENZENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = 74000 (04)	
43 SAMPLES	BDL	BDL		BDL	
236-TRICHLOROTOLUENE (NG/L)		DET/N LIMIT = 5.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL		BDL	
245-TRICHLOROTOLUENE (NG/L)		DET/N LIMIT = 5.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL		BDL	
26A-TRICHLOROTOLUENE (NG/L)		DET/N LIMIT = 5.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
CHLOROPHENOLS					
234-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A	
8 SAMPLES	BDL				
2345-TETCHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
8 SAMPLES	BDL				
2356-TETCHLOROPHENOL (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
8 SAMPLES	BDL				
245-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 2600000 (D4)	
8 SAMPLES	BDL				
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 5000 (A1)	
8 SAMPLES	BDL				
PENTACHLOROPHENOL (NG/L)		DET'N LIMIT = 10.00		GUIDELINE = 60000 (A1)	
8 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
PESTICIDES AND PCB						
ALDRIN (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 700 (A1)	
43 SAMPLES	BDL	BDL	BDL		BDL	
ALPHA BHC (NG/L)						
			DET'N LIMIT = 1.000		GUIDELINE = 700 (G)	
1991 JAN	BDL	BDL	BDL		BDL	
1991 FEB	BDL	BDL	BDL		BDL	
1991 MAR	2.000 <T	1.000 <T	1.000 <T		1.000 <T	
1991 APR	BDL	BDL	BDL		BDL	
1991 MAY	BDL	BDL	BDL		BDL	
1991 JUN	BDL	BDL	BDL		BDL	
1991 JUL	IAW	IAW	IAW		IAW	
1991 SEP	IAW	IAW	IAW		IAW	
1991 NOV	BDL	BDL	BDL		BDL	
1992 APR	BDL	BDL	BDL		BDL	
1992 JUN	BDL	BDL	BDL		BDL	
1992 AUG	BDL	BDL	BDL		BDL	
1992 OCT	BDL	BDL	BDL		BDL	
1992 DEC	BDL	BDL	BDL		BDL	
BETA BHC (NG/L)						
			DET'N LIMIT = 1.00		GUIDELINE = 300 (G)	
43 SAMPLES	BDL	BDL	BDL		BDL	
LINDANE (GAMMA BHC) (NG/L)						
			DET'N LIMIT = 1.000		GUIDELINE = 4000 (A1)	
1991 JAN	BDL	BDL	BDL		BDL	
1991 FEB	BDL	BDL	BDL		BDL	
1991 MAR	BDL	BDL	BDL		BDL	
1991 APR	BDL	BDL	BDL		BDL	
1991 MAY	BDL	BDL	BDL		BDL	
1991 JUN	2.000 <T	BDL	BDL		BDL	
1991 JUL	IAW	IAW	IAW		IAW	
1991 SEP	IAW	IAW	IAW		IAW	
1991 NOV	BDL	BDL	BDL		BDL	
1992 APR	BDL	BDL	BDL		BDL	
1992 JUN	1.000 <T	BDL	BDL		BDL	
1992 AUG	BDL	BDL	BDL		BDL	
1992 OCT	BDL	BDL	BDL		BDL	
1992 DEC	BDL	BDL	BDL		BDL	
ALPHA CHLORDANE (NG/L)						
			DET'N LIMIT = 2.000		GUIDELINE = 7000 (A1)	
43 SAMPLES	BDL	BDL	BDL		BDL	

TABLE 4
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TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
PESTICIDES AND PCB					
GAMMA CHLORDANE (NG/L)		DET'N LIMIT = 2.00		GUIDELINE = 7000 (A1)	
43 SAMPLES	BDL	BDL	.	BDL	.
DIELDRIN (NG/L)		DET'N LIMIT = 2.00		GUIDELINE = 700 (A1)	
43 SAMPLES	BDL	BDL	.	BDL	.
METHOXYCHLOR (NG/L)		DET'N LIMIT = 5.0		GUIDELINE = 900000 (A1)	
43 SAMPLES	BDL	BDL	.	BDL	.
ENDOSULFAN 1 (NG/L)		DET'N LIMIT = 2.00		GUIDELINE = 74000 (D4)	
43 SAMPLES	BDL	BDL	.	BDL	.
ENDOSULFAN II (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 74000 (D4)	
43 SAMPLES	BDL	BDL	.	BDL	.
ENDRIN (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 1600 (D3)	
43 SAMPLES	BDL	BDL	.	BDL	.
ENDOSULFAN SULPHATE (NG/L)		DET'N LIMIT = 5.00		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
HEPTACHLOR EPOXIDE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 3000 (A1)	
40 SAMPLES	BDL	BDL	.	BDL	.
HEPTACHLOR (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 3000 (A1)	
43 SAMPLES	BDL	BDL	.	BDL	.
MIREX (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
OXYCHLORDANE (NG/L)		DET'N LIMIT = 2.000		GUIDELINE = N/A	
43 SAMPLES	BDL	BDL	.	BDL	.
O,P-DDT (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 30000 (A1)	
43 SAMPLES	BDL	BDL	.	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
			FREE FLOW	STANDING	FREE FLOW	STANDING	STANDING	
PESTICIDES AND PCB								
PCB (NG/L)			DET'N LIMIT = 20.00		GUIDELINE = 3000 (A2)			
42 SAMPLES		BDL	BDL		BDL		BDL	
P,P-0DD (NG/L)			DET'N LIMIT = 5.000		GUIDELINE = 30000 (A1)			
43 SAMPLES		BDL	BDL		BDL		BDL	
P,P-0DE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 30000 (A1)			
43 SAMPLES		BDL	BDL		BDL		BDL	
P,P-0DT (NG/L)			DET'N LIMIT = 5.000		GUIDELINE = 30000 (A1)			
43 SAMPLES		BDL	BDL		BDL		BDL	
TOXAPHENE (NG/L)			DET'N LIMIT = 500.0		GUIDELINE = 5000 (A1)			
27 SAMPLES		BDL	BDL		BDL		BDL	
AMETRINE (NG/L)			DET'N LIMIT = 50.0		GUIDELINE = 300000 (03)			
26 SAMPLES		BDL	BDL		BDL		BDL	
ATRAZINE (NG/L)			DET'N LIMIT = 50.0		GUIDELINE = 60000 (A2)			
1991 JAN		180.000 <T	160.000 <T					
1991 FEB		IPE	IPE					
1991 MAR		250.000 <T	290.000 <T					
1991 APR		90.000 <T	BDL					
1991 MAY		BDL	BDL					
1991 JUN		2300.000	1350.000					
1991 JUL		506.000	535.000					
1991 SEP		420.000 <T	240.000 <T					
1991 NOV		270.000 <T	230.000 <T					
1992 APR		270.000 <T	190.000 <T					
1992 JUN		340.000 <T	90.000 <T					
1992 AUG		790.000	530.000					
1992 OCT		300.000 <T	200.000 <T					
1992 DEC		90.000 <T	110.000 <T					
ATRATONE (NG/L)			DET'N LIMIT = 50.0		GUIDELINE = N/A			
26 SAMPLES		BDL	BDL					

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW		DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW		DIST. SYSTEM ST ANNE STANDING
PESTICIDES AND PCB								
CYANAZINE (BLADEX) (NG/L)			DET'N LIMIT = 100.0		GUIDELINE = 10000 (A2)			
1991 JAN	BDL	BDL	.	.	.	.	.	.
1991 FEB	IPE	IPE	.	.	.	.	.	.
1991 MAR	BDL	BDL	.	.	.	.	.	.
1991 APR	BDL	BDL	.	.	.	.	.	.
1991 MAY	BDL	BDL	.	.	.	.	.	.
1991 JUN	2210.000	1840.000	.	.	.	.	.	.
1991 JUL	294.000 <T	423.000 <T	.	.	.	.	.	.
1991 SEP	BDL	BDL	.	.	.	.	.	.
1991 NOV	BDL	BDL	.	.	.	.	.	.
1992 APR	BDL	BDL	.	.	.	.	.	.
1992 JUN	BDL	BDL	.	.	.	.	.	.
1992 AUG	BDL	BDL	.	.	.	.	.	.
1992 OCT	BDL	BDL	.	.	.	.	.	.
1992 DEC	BDL	BDL	.	.	.	.	.	.
DESETHYL ATRAZINE (NG/L)								
			DET'N LIMIT = 200.0		GUIDELINE = 60000 (A2)			
1991 JAN	BDL	BDL	.	.	.	.	.	.
1991 FEB	IPE	IPE	.	.	.	.	.	.
1991 MAR	BDL	BDL	.	.	.	.	.	.
1991 APR	BDL	BDL	.	.	.	.	.	.
1991 MAY	BDL	BDL	.	.	.	.	.	.
1991 JUN	310.000 <T	250.000 <T	.	.	.	.	.	.
1991 JUL	BDL	BDL	.	.	.	.	.	.
1991 SEP	BDL	BDL	.	.	.	.	.	.
1991 NOV	BDL	BDL	.	.	.	.	.	.
1992 APR	BDL	BDL	.	.	.	.	.	.
1992 JUN	BDL	BDL	.	.	.	.	.	.
1992 AUG	240.000 <T	BDL	.	.	.	.	.	.
1992 OCT	BDL	BDL	.	.	.	.	.	.
1992 DEC	BDL	BDL	.	.	.	.	.	.
DESETHYL SIMAZINE (NG/L)								
			DET'N LIMIT = 200.0		GUIDELINE = 10000 (A2)			
24 SAMPLES	BDL	BDL	.	.	.	.	.	.
PROMETONE (NG/L)								
			DET'N LIMIT = 50.000		GUIDELINE = 52500 (D3)			
26 SAMPLES	BDL	BDL	.	.	.	.	.	.
PROPAGAZINE (NG/L)								
			DET'N LIMIT = 50.000		GUIDELINE = 700000 (D3)			
26 SAMPLES	BDL	BDL	.	.	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
PESTICIDES AND PCB					
PROMETRYNE (NG/L)		DET'N LIMIT = 50.000		GUIDELINE = 1000 (A2)	
26 SAMPLES	BDL				
METRIBUZIN (SENCOR) (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 80000 (A1)	
26 SAMPLES	BDL				
SIMAZINE (NG/L)		DET'N LIMIT = 50.00		GUIDELINE = 10000 (A2)	
1991 JAN	BDL				
1991 FEB	IPE				
1991 MAR	BDL				
1991 APR	BDL				
1991 MAY	BDL				
1991 JUN	BDL				
1991 JUL	BDL				
1991 SEP	BDL				
1991 NOV	BDL				
1992 APR	140.000 <T				
1992 JUN	BDL				
1992 AUG	BDL				
1992 OCT	BDL				
1992 DEC	BDL				
ALACHLOR (LASSO) (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 5000 (A2)	
26 SAMPLES	BDL				
METOLACHLOR (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 50000 (A2)	
1991 JAN	BDL				
1991 FEB	IPE				
1991 MAR	BDL				
1991 APR	BDL				
1991 MAY	BDL				
1991 JUN	2630.000 <T				
1991 JUL	BDL				
1991 SEP	BDL				
1991 NOV	BDL				
1992 APR	BDL				
1992 JUN	BDL				
1992 AUG	BDL				
1992 OCT	BDL				
1992 DEC	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	PESTICIDES AND PCB		DET'N LIMIT = 5.00		GUIDELINE = 206000 (04)	
		HEXACHLOROCYCLOPENTADIEN (NG/L)		LAVAL ST N FREE FLOW	LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
1991 JAN	BDL	BDL	BDL	BDL	.	BDL	.
1991 FEB	BDL	45,000 <T	BDL	65,000	.	55,000	.
1991 MAR	BDL	BDL	BDL	BDL	.	14,000 <T	.
1991 APR	BDL	BDL	BDL	BDL	.	BDL	.
1991 MAY	BDL	160,000	BDL	85,000	.	78,000	.
1991 JUN	!QU	!QU	!QU	!QU	.	!QU	.
1991 JUL	!AW	!AW	!AW	!AW	.	!AW	.
1991 SEP	!AW	!AW	!AW	!AW	.	!AW	.
1991 NOV	BDL	64,000	44,000 <T	40,000 <T	.	40,000 <T	.
1992 APR	!QU	!QU	!QU	!QU	.	!QU	.
1992 JUN	!QU	!QU	!QU	!QU	.	!QU	.
1992 AUG	!QU	!QU	!QU	!QU	.	!QU	.
1992 OCT	!QU	!QU	!QU	!QU	.	!QU	.
1992 DEC	!QU	!QU	!QU	!QU	.	!QU	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N		DIST. SYSTEM LAVAL ST N		DIST. SYSTEM ST ANNE		DIST. SYSTEM ST ANNE	
		FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
PHENOLICS									
PHENOLICS (UG/L)		DET'N LIMIT =		0.2	GUIDELINE = N/A				
1991 JAN	BDL								
1991 FEB	.400 <T								
1991 MAR	1.200								
1991 APR	.400 <T								
1991 MAY	.800 <T								
1991 JUN	BDL								
1991 JUL	BDL								
1991 SEP	BDL								
1991 NOV	.800 <T								
1992 FEB	BDL								
1992 APR	.600 <T								
1992 JUN	BDL								
1992 AUG	BDL								
1992 OCT	BDL								
1992 DEC	.600 <T								

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
POLYAROMATIC HYDROCARBONS						
PHENANTHRENE (NG/L)			DET'N LIMIT = 10.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
ANTHRACENE (NG/L)			DET'N LIMIT = 1.0		GUIDELINE = N/A	
23 SAMPLES	BDL	BDL	BDL	.	BDL	.
FLUORANTHENE (NG/L)			DET'N LIMIT = 20.0		GUIDELINE = 42000 (D4)	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
PYRENE (NG/L)			DET'N LIMIT = 20.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
BENZO(A)ANTHRACENE (NG/L)			DET'N LIMIT = 20.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
CHRYSENE (NG/L)			DET'N LIMIT = 50.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
DIMETH. BENZ(A)ANTHR (NG/L)			DET'N LIMIT = 5.0		GUIDELINE = N/A	
23 SAMPLES	BDL	BDL	BDL	.	BDL	.
BENZO(E) PYRENE (NG/L)			DET'N LIMIT = 50.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
BENZO(B) FLUORANTHEN (NG/L)			DET'N LIMIT = 10.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
PERYLENE (NG/L)			DET'N LIMIT = 10.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
BENZO(K) FLUORANTHEN (NG/L)			DET'N LIMIT = 1.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL	BDL	.	BDL	.
BENZO(A) PYRENE (NG/L)			DET'N LIMIT = 5.0		GUIDELINE = 10 (A1)	
23 SAMPLES	BDL	BDL	BDL	.	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
POLYAROMATIC HYDROCARBONS					
BENZO(G,H,I) PERYLEN (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL		BDL	
DIBENZO(A,H) ANTHRAC (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL		BDL	
INDENO(1,2,3-C,D) PY (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL		BDL	
BENZO(B) CHRYSENE (NG/L)		DET'N LIMIT = 2.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL		BDL	
CORONENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
27 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
SPECIFIC PESTICIDES					
TOXAPHENE (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 5000 (A1)	
16 SAMPLES	BDL	BDL		BDL	
2,4,5-T (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 280000 (A1)	
8 SAMPLES	BDL				
2,4-D (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 100000 (A1)	
8 SAMPLES	BDL				
2,4-DB (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = N/A	
8 SAMPLES	BDL				
2,4 D PROPIONIC ACID (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A	
8 SAMPLES	BDL				
DICAMBA (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 120000 (A1)	
1991 MAY	BDL				
1991 NOV	BDL	60,000 <T			
1992 JUN	BDL				
1992 OCT	BDL				
2,4,5-TP (SILVEX) (NG/L)		DET'N LIMIT = 20.00		GUIDELINE = 10000 (A1)	
8 SAMPLES	BDL				
DIAZINON (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 20000 (A1)	
6 SAMPLES	BDL				
DICHLOROVOS (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
6 SAMPLES	BDL				
CHLORPYRIFOS (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
6 SAMPLES	BDL				
ETHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 35000 (G)	
6 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
SPECIFIC PESTICIDES					
MALATHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 190000 (A1)	
6 SAMPLES	BDL				
MEVINPHOS (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
6 SAMPLES	BDL				
METHYL PARATHION (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 9000 (D3)	
6 SAMPLES	BDL				
METHYLTRITHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
6 SAMPLES	BDL				
PARATHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 50000 (A1)	
6 SAMPLES	BDL				
PHORATE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 2000 (A2)	
6 SAMPLES	BDL				
RELDAN (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
6 SAMPLES	BDL				
RONNEL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
6 SAMPLES	BDL				
CARBOFURAN (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 90000 (A1)	
7 SAMPLES	BDL				
CHLOROPROPHAM (CIPC) (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 350000 (G)	
7 SAMPLES	BDL				
DIALLATE (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
7 SAMPLES	BDL				
EPTAM (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
7 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW		DIST. SYSTEM LAVAL ST N STANDING		DIST. SYSTEM ST ANNE FREE FLOW		DIST. SYSTEM ST ANNE STANDING	
SPECIFIC PESTICIDES										
IPC (NG/L)			DET'N LIMIT = 2000.0				GUIDELINE = N/A			
7 SAMPLES			BDL		BDL					
PROPOXUR (NG/L)			DET'N LIMIT = 2000.0				GUIDELINE = 140000 (D3)			
7 SAMPLES			BDL		BDL					
CARBARYL (NG/L)			DET'N LIMIT = 200.0				GUIDELINE = 90000 (A1)			
7 SAMPLES			BDL		BDL					
BUTYLATE (NG/L)			DET'N LIMIT = 2000.0				GUIDELINE = 245000 (D3)			
7 SAMPLES			BDL		BDL					

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
BENZENE (UG/L)		DET/N LIMIT = 0.05		GUIDELINE = 5 (A1)	
1991 JAN	BDL	BDL	BDL	BDL	BDL
1991 FEB	BDL	BDL	BDL	BDL	BDL
1991 MAR	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	BDL	BDL	BDL	BDL
1991 MAY	BDL	BDL	BDL	BDL	BDL
1991 JUN	BDL	BDL	BDL	BDL	BDL
1991 JUL	BDL	BDL	BDL	BDL	BDL
1991 SEP	BDL	BDL	BDL	BDL	BDL
1991 NOV	BDL	BDL	BDL	BDL	BDL
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 JUN	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL
TOLUENE (UG/L)					
		DET/N LIMIT = 0.05		GUIDELINE = 24 (A3)	
1991 JAN	BDL	BDL	BDL	BDL	BDL
1991 FEB	BDL	BDL	BDL	BDL	BDL
1991 MAR	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	BDL	BDL	BDL	BDL
1991 MAY	BDL	BDL	BDL	BDL	BDL
1991 JUN	BDL	BDL	BDL	BDL	BDL
1991 JUL	BDL	BDL	BDL	BDL	BDL
1991 SEP	BDL	BDL	BDL	BDL	BDL
1991 NOV	BDL	BDL	BDL	BDL	BDL
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 JUN	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
ETHYLBENZENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 2.4 (A3)	
1991 JAN	.050 <T	.100 <T	BDL	BDL	BDL
1991 FEB	.100 <T	BDL	BDL	.050 <T	.
1991 MAR	.100 <T	.100 <T	.050 <T	.100 <T	.
1991 APR	BDL	BDL	.050 <T	BDL	.
1991 MAY	BDL	.050 <T	BDL	.050 <T	.
1991 JUN	BDL	.050 <T	.050 <T	.100 <T	.
1991 JUL	BDL	.200 <T	BDL	.050 <T	.
1991 SEP	BDL	.100 <T	.100 <T	.100 <T	.
1991 NOV	BDL	.100 <T	.100 <T	BDL	.
1992 FEB	BDL	BDL	BDL	.	.
1992 APR	.100 <T	.200 <T	.	.250 <T	.
1992 JUN	BDL	.100 <T	.150 <T	.	.
1992 AUG	BDL	BDL	.	.150 <T	.
1992 OCT	BDL	.100 <T	.150 <T	.	.
1992 DEC	.100 <T	IEF	.	.100 <T	.
P-XYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 300 (A3*)	
55 SAMPLES		BDL	BDL	.	BDL
M-XYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 300 (A3*)	
1991 JAN	BDL	.100 <T	BDL	BDL	.
1991 FEB	BDL	BDL	BDL	BDL	.
1991 MAR	BDL	.100 <T	.100 <T	.100 <T	.
1991 APR	BDL	.100 <T	.100 <T	BDL	.
1991 MAY	BDL	BDL	BDL	BDL	.
1991 JUN	BDL	BDL	BDL	BDL	.
1991 JUL	BDL	BDL	BDL	BDL	.
1991 SEP	BDL	BDL	.100 <T	BDL	.
1991 NOV	BDL	BDL	BDL	BDL	.
1992 FEB	BDL	BDL	BDL	.	.
1992 APR	BDL	.400 <T	.	.400 <T	.
1992 JUN	BDL	BDL	BDL	.	.
1992 AUG	BDL	.	.	.200 <T	.
1992 OCT	BDL	.200 <T	.300 <T	.	.
1992 DEC	BDL	IEF	.	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
O-XYLENE (UG/L)		DET/N LIMIT = 0.05		GUIDELINE = 300 (A3*)	
1991 JAN	BDL	.050 <T	BDL	BDL	.
1991 FEB	BDL	BDL	BDL	BDL	.
1991 MAR	BDL	BDL	BDL	BDL	.
1991 APR	BDL	.050 <T	BDL	BDL	.
1991 MAY	BDL	BDL	BDL	BDL	.
1991 JUN	BDL	BDL	BDL	BDL	.
1991 JUL	BDL	BDL	BDL	BDL	.
1991 SEP	BDL	BDL	BDL	BDL	.
1991 NOV	BDL	BDL	BDL	BDL	.
1992 FEB	BDL	BDL	BDL	BDL	.
1992 APR	BDL	.150 <T	BDL	.150 <T	.
1992 JUN	BDL	BDL	BDL	.100 <T	.
1992 AUG	BDL	BDL	BDL	BDL	.
1992 OCT	BDL	.050 <T	BDL	BDL	.
1992 DEC	BDL	IEF	BDL	BDL	.
STYRENE (UG/L)					
		DET/N LIMIT = 0.05		GUIDELINE = 100 (D1)	
1991 JAN	.100 <T	.150 <T	BDL	BDL	.
1991 FEB	.150 <T	BDL	.050 <T	.100 <T	.
1991 MAR	.150 <T	.150 <T	.100 <T	.150 <T	.
1991 APR	BDL	BDL	.100 <T	BDL	.
1991 MAY	BDL	.100 <T	.050 <T	.150 <T	.
1991 JUN	BDL	.100 <T	.100 <T	.100 <T	.
1991 JUL	BDL	.350 <T	.100 <T	.100 <T	.
1991 SEP	BDL	.100 <T	.150 <T	.100 <T	.
1991 NOV	BDL	.100 <T	.200 <T	BDL	.
1992 FEB	.150 <T	.150 <T	.200 <T	.	.
1992 APR	.100 <T	.150 <T	.	.250 <T	.
1992 JUN	BDL	.150 <T	.	.250 <T	.
1992 AUG	BDL	BDL	.	.	.
1992 OCT	BDL	.100 <T	.200 <T	.	.
1992 DEC	.150 <T	IEF	.	.150 <T	.
1,1-DICHLOROETHYLENE (UG/L)					
		DET/N LIMIT = 0.100		GUIDELINE = 7 (D1)	
55 SAMPLES	BDL	BDL	BDL	BDL	.
METHYLENE CHLORIDE (UG/L)					
		DET/N LIMIT = 0.50		GUIDELINE = 50 (A1)	
55 SAMPLES	BDL	BDL	BDL	BDL	.
T12-DICHLOROETHYLENE (UG/L)					
		DET/N LIMIT = 0.10		GUIDELINE = 70 (D1)	
55 SAMPLES	BDL	BDL	BDL	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
1,1-DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = N/A	
55 SAMPLES	BDL	BDL	BDL	.	BDL
CHLOROFORM (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)	
1991 JAN	BDL	50.400	.	45.300	.
1991 FEB	BDL	44.000	.	39.000	.
1991 MAR	BDL	2.700	.	2.400	.
1991 APR	BDL	45.500	.	40.000	.
1991 MAY	.200 <T	94.100	.	83.500	.
1991 JUN	BDL	122.800	.	119.400	.
1991 JUL	.700 <T	147.800	.	124.900	.
1991 SEP	BDL	154.500	.	134.500	.
1991 NOV	.300 <T	50.800	.	47.200	.
1992 FEB	BDL	4.000	.	18.500	.
1992 APR	BDL	20.700	.	111.800	.
1992 JUN	BDL	123.500	.	57.200	.
1992 AUG	BDL	128.800	.	.	.
1992 OCT	BDL	81.700	.	.	.
1992 DEC	BDL	1EF	.	.	.
1,1,1-TRICHLOROETHANE (UG/L)					
DET'N LIMIT = 0.02		GUIDELINE = 200 (D1)			
1991 JAN	BDL	.060 <T	.	.060 <T	.
1991 FEB	BDL	.060 <T	.	.080 <T	.
1991 MAR	.040 <T	.100 <T	.	.040 <T	.
1991 APR	.040 <T	.060 <T	.	.100 <T	.
1991 MAY	BDL	BDL	.	BDL	.
1991 JUN	BDL	BDL	.	BDL	.
1991 JUL	BDL	BDL	.	BDL	.
1991 SEP	BDL	BDL	.	BDL	.
1991 NOV	BDL	BDL	.	BDL	.
1992 FEB	BDL	.240	.	BDL	.
1992 APR	BDL	.060 <T	.	BDL	.
1992 JUN	BDL	BDL	.	BDL	.
1992 AUG	BDL	BDL	.	BDL	.
1992 OCT	BDL	BDL	.	BDL	.
1992 DEC	BDL	1EF	.	BDL	.
1,2 DICHLOROETHANE (UG/L)					
DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)			
55 SAMPLES	BDL	BDL	.	BDL	.
CARBON TETRACHLORIDE (UG/L)					
DET'N LIMIT = 0.20		GUIDELINE = 5 (A1)			
55 SAMPLES	BDL	BDL	.	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
1,2-DICHLOROPROPANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (D1)	
55 SAMPLES	BDL	BDL	BDL	BDL	BDL
TRICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 50 (A1)	
55 SAMPLES	BDL	BDL	BDL	BDL	BDL
DICHLOBROMOMETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 350 (A1+)	
1991 JAN	BDL	5.900 SPS	3.050	3.700	3.700
1991 FEB	BDL	14.750	7.700	9.700	9.700
1991 MAR	BDL	.400 <T	.250 <T	.300 <T	.300 <T
1991 APR	BDL	4.300	2.500	2.650	2.650
1991 MAY	.050 <T	9.400	7.200	7.300	7.300
1991 JUN	BDL	8.900	7.700	7.900	7.900
1991 JUL	BDL	17.750	16.000	16.200	16.200
1991 SEP	BDL	32.900	26.300	28.300	28.300
1991 NOV	BDL	25.950	18.350	20.500	20.500
1992 FEB	BDL	4.250	2.450	.	.
1992 APR	BDL	.750	.	.450 <T	.450 <T
1992 JUN	BDL	17.500	12.850	.	.
1992 AUG	BDL	24.100	.	21.600	21.600
1992 OCT	BDL	19.450	14.600	.	.
1992 DEC	BDL	IEF	.	7.050	7.050
112-TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 0.6 (D4)	
55 SAMPLES	BDL	BDL	BDL	BDL	BDL
CHLORO Dibromomethane (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)	
1991 JAN	BDL	.300 <T	.200 <T	.300 <T	.300 <T
1991 FEB	BDL	2.300	1.300	2.100	2.100
1991 MAR	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	.400 <T	.300 <T	.300 <T	.300 <T
1991 MAY	BDL	.500 <T	.400 <T	.500 <T	.500 <T
1991 JUN	BDL	.300 <T	.300 <T	.300 <T	.300 <T
1991 JUL	BDL	1.200	1.100	1.300	1.300
1991 SEP	BDL	4.800	4.100	4.400	4.400
1991 NOV	BDL	6.300	4.800	5.500	5.500
1992 FEB	BDL	1.900	1.200	.	.
1992 APR	BDL	BDL	.	BDL	BDL
1992 JUN	BDL	1.300	1.100	.	.
1992 AUG	BDL	2.700	.	2.700	2.700
1992 OCT	BDL	2.500	2.200	.	.
1992 DEC	BDL	IEF	.	.500 <T	.500 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
TETRACHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 65 (A5)	
55 SAMPLES	BDL	BDL			BDL
BROMOFORM (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 350 (A1+)	
55 SAMPLES	BDL	BDL			BDL
1122-TETRACHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 0.17 (D4)	
55 SAMPLES	BDL	BDL			BDL
VINYL CHLORIDE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 2 (D1)	
14 SAMPLES	BDL	BDL			BDL
C12-DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 70 (D1)	
14 SAMPLES	BDL	BDL			BDL
CHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 1510 (D3)	
55 SAMPLES	BDL	BDL			BDL
1,4-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 5 (A1)	
55 SAMPLES	BDL	BDL			BDL
1,3-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 3750 (D3)	
55 SAMPLES	BDL	BDL			BDL
1,2-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 200 (A1)	
55 SAMPLES	BDL	BDL			BDL
ETHYLENE DIBROMIDE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 50 (D1)	
55 SAMPLES	BDL	BDL			BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
VOLATILES					
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 350 (A1)	
1991 JAN	BDL	56.650	40.950	49.250	.
1991 FEB	BDL	61.050	41.800	50.800	.
1991 MAR	BDL	3.100 <T	2.800 <T	2.750 <T	.
1991 APR	BDL	50.100	41.950	42.900	.
1991 MAY	BDL	104.050	95.700	91.250	.
1991 JUN	BDL	132.000	124.600	127.600	.
1991 JUL	BDL	166.750	158.300	142.400	.
1991 SEP	BDL	192.200	160.600	167.200	.
1991 NOV	BDL	83.050	64.750	73.200	.
1992 FEB	BDL	10.150	7.250	.	.
1992 APR	BDL	21.450	.	18.950	.
1992 JUN	BDL	142.300	118.650	.	.
1992 AUG	BDL	155.600	.	136.100	.
1992 OCT	BDL	103.650	80.800	.	.
1992 DEC	BDL	IEF	.	64.750	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 CASSELMAN WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LAVAL ST N FREE FLOW	DIST. SYSTEM LAVAL ST N STANDING	DIST. SYSTEM ST ANNE FREE FLOW	DIST. SYSTEM ST ANNE STANDING
RADIONUCLIDES					
COBALT 60 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = N/A	
8 SAMPLES	BDL	.		.	
CESIUM 134 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = N/A	
8 SAMPLES	BDL	.		.	
CESIUM 137 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = 50 (A1)	
8 SAMPLES	BDL	.		.	
GROSS ALPHA COUNT (BQ/L)		DET'N LIMIT = 0.04		GUIDELINE = 0.55 (D1)	
1991 FEB	BDL	.		.	
1991 SEP	.070	.		.	
1992 APR	.050	.		.	
GROSS BETA COUNT (BQ/L)		DET'N LIMIT = 0.04		GUIDELINE = N/A	
1991 FEB	.230	.		.	
1991 SEP	.170	.		.	
1992 APR	.200	.		.	
TRITIUM (BQ/L)		DET'N LIMIT = 7.00		GUIDELINE = 40000 (A1)	
1991 FEB	9.000	.		.	
1991 SEP	BDL	.		.	
1992 APR	BDL	.		.	
IODOINE 131 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = 10 (A1)	
8 SAMPLES	BDL	.		.	

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.20	30-500 (A4)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.20	100.0 (F2)
CHLORIDE	MG/L	0.20	250.0 (A3)
COLOUR	TCU	0.50	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.00	400.0 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.10	5.0 (A3)
FLUORIDE	MG/L	0.01	1.5* (A1)
HARDNESS	MG/L	0.50	80-100 (A4)
IONCAL	DMNSLESS	N/A	N/A
LANGEIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.10	30.0 (F2)
NITRATES (TOTAL)	MG/L	0.005	10.0 (A1)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
POTASSIUM	MG/L	0.010	10.0 (F2)
RESIDUE FILTRATE (CALCULATED TOS)	MG/L	N/A	500.0 (A3)
SODIUM	MG/L	0.20	200.0 (A4)
SULPHATE	MG/L	0.20	500.0 (A4)
TURBIDITY	FTU	0.05	1.0 (A1)

* The Maximum Acceptable Concentration (MAC) for naturally occurring fluoride in drinking water is 2.4 mg/L.

CHLOROAROMATICS			
1,2,3-TRICHLOROBENZENE	NG/L	5.0	N/A
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,4-TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.0	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.0	N/A
2,3,6-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,6A-TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE (HCB)	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	100.0	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	20.0	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
2,4,5-TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	N/A
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
POLYNUCLEAR AROMATIC HYDROCARBONS			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000 (D4)
INDENO(1,2,3-C,O) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRATONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DESETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADEX)	NG/L	100.0	10000 (A2)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
-----	-----	-----	-----
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	30000 (A1)
O,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDE	NG/L	1.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPAGINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
DESETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	N/A
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.0	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.0	280000 (A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.0	100000 (A1)
2,4-DICHLOROPHENOXYBUTYRIC ACID (2,4-DB)	NG/L	200.0	N/A
2,4,5-TP (SILVEX)	NG/L	20.0	10000 (A1)
BUTYLATE (SUTAN)	NG/L	2000.0	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.0	90000 (A1)
CARBOFURAN	NG/L	2000.0	90000 (A1)
CHLORPROPHAM (CIPC)	NG/L	2000.0	350000 (G)
CHLORPYRIFOS (DURSBAN)	NG/L	20.0	N/A
DIALATE	NG/L	2000.0	N/A
DIAZINON	NG/L	20.0	20000 (A1)
DICAMBA	NG/L	50.0	120000 (A1)
DICHLOROVOS	NG/L	20.0	N/A
EPTAM	NG/L	2000.0	N/A
ETHION	NG/L	20.0	35000 (G)
IPC	NG/L	2000.0	N/A
MALATHION	NG/L	20.0	190000 (A1)
METHYL PARATHION	NG/L	50.0	9000 (D3)
METHYLTRITHION	NG/L	20.0	N/A
MEVINPHOS	NG/L	20.0	N/A
PARATHION	NG/L	20.0	50000 (A1)
PHORATE (THIMET)	NG/L	20.0	2000 (A2)
PICHLORAM	NG/L	100.0	190000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.0	140000 (D3)
RELDAN	NG/L	20.0	N/A
RONNEL	NG/L	20.0	N/A
VOLATILES			
1,1-DICHLOROETHANE	UG/L	0.10	N/A
1,1-DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2-DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2-DICHLOROETHANE	UG/L	0.05	5 (A1)
1,2-DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3-DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4-DICHLOROBENZENE	UG/L	0.10	5 (A1)
1,1,1-TRICHLOROETHANE	UG/L	0.02	200 (D1)
1,1,2-TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1,1,2,2-TETRACHLOROETHANE	UG/L	0.05	0.17 (D4)

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORO Dibromomethane	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
CIS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHYLENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	65 (A5)
TRANS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)
VINYL CHLORIDE	UG/L	0.10	2 (D1)
RADIONUCLIDES			
TRITIUM	BQ/L	7.0	40000 (A1)
GROSS ALPHA COUNT	BQ/L	0.04	0.55# (D1)
GROSS BETA COUNT	BQ/L	0.04	N/A
COBALT 60	BQ/L	0.70	N/A
CESIUM 134	BQ/L	0.70	N/A
CESIUM 137	BQ/L	0.70	50 (A1)
IODINE 131	BQ/L	0.70	10 (A1)

Equal to 15.0 Picocuries/litre

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1992, 109 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment and Energy (MOEE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOEE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOEE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY

All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS

Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME

Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOEE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOEE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOEE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOEE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

PARAMETER REFERENCE INFORMATION

NAME: BENZENE

CAS#: 71-43-2

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 $\mu g/L$

SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27)
CYCLOHEXATRIENE (41)

CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NONPOLAR LIQUID, OF
HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN
WITH SMOKING FLAME (30)

PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41)
THRESHOLD ODOUR: 0.5 - 10 PPM IN WATER
THRESHOLD TASTE: 0.5 mg/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS
AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT
A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES,
SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM
SOILS OR ARE DEGRADED RATHER QUICKLY (80)

SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR
DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES;
COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER
COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND
RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING
AGENT; GASOLINE.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING
BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION
WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION,
COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION,
OXIDATION

ADDITIONAL PROPERTIES: MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27)
BOILING POINT: 80.1°C (27)
SPECIFIC GRAVITY: 0.8790 AT 20°C (27)
VAPOUR PRESSURE: 100 MM AT 26.1°C (27)
HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41)
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39)
CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41)
SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle -fill bottle completely without bubbles
Organics (OWOC), (OWTRI)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Specific Pesticides (OWCP), (PEOP), (PECAR)	-as per Organics -three extra bottles must be filled
Polyaromatic hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate
Cyanide (Treated only)	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (Caution: NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) - and potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) (Caution: HNO_3 & $\text{K}_2\text{Cr}_2\text{O}_7$ are corrosive)

Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year) (PBVOL), (PBEXT)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

Steps:

1. Let sampling water tap run for an adequate time to clear the sample line.
2. Record time of day on submission sheet.
3. Record temperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.
6. No smoking in area of sample location.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.

5. Fill general chemistry and metals bottles.

6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (Caution: HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Polyaromatic Hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate

Steps:

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

